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THE BRITISH CENTRAL AFRICA PROTECTORATE.*

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Four years ago I had the honour of addressing the Royal Geographical Society on "British Central Africa." To-night I have been invited to read another paper before you, and this time its title is "The British Central Africa Protectorate," which will show you that in four years the geographical interest of this country has become largely increased by political developments. That, indeed, is one of the chiefest features of interest attaching to the Royal Geographical Society; the measures which it takes to enlighten the public mind on the subject of geography so often lead, by a natural and proper sequence, to an increased political interest being taken in regions which, but for the strenuous efforts of this Society, would have been little if at all known to the British public, and this increased political interest not unfrequently receives the Government's seal and sanction by the incorporation of these recently discovered regions within the mighty scope of the British Empire.

There are still happily among us, and no doubt present in this audience to-night, not a few persons who have listened to the wonder-tales of Livingstone, Burton, Speke, and Grant; possibly also to the addresses of Barth and Baikie. Would it not have added one hundredfold to the interest with which they hung on the words of these remarkable explorers had they known that before many decades had elapsed the greater part of the Zambezi, the lakes of Nyasa, Mweru, Bangweolo, and a portion of Tanganyika, would have been included within the British Empire; that the kingdom of Buganda would have become a

* Paper read at the Royal Geographical Society, November 12, 1894. Map, p. 288.

British Protectorate; and that the seemingly wild predictions of Dr. Barth and the hopes of Dr. Baikie would have been realized in the placing of the richest regions of the Niger and the Benue under a British Protectorate and a chartered company? These reflections, therefore, may perhaps enhance our interest in the proceedings of this Society, and the researches of explorers will be more eagerly followed than heretofore, because of the possible relation they may bear to the empire that we are at last beginning to value and to understand.

In my remarks to-night I am going to credit my audience with a fairly retentive memory. I shall assume that a large proportion of those persons present either listened to my address of four years ago or read it when printed in the Society's *Proceedings*, and I shall endeavour not to fatigue you with a twice-told tale, but to take up other phases of the British Central Africa Protectorate not dealt with in my earlier paper; and as I have little fresh to say from personal observation about the sphere of influence beyond the Protectorate, I shall confine my remarks to a more minute description of certain districts within the limits of the Protectorate; for you must understand that in British Central Africa there is a distinction between the regions round Lake Nyasa, which are known as the British Protectorate, and the countries to the west and north, which are within the British "Sphere of Influence." The Protectorate is administered by the Imperial Government through its Commissioner and Consul-General, and the Sphere of Influence beyond is supervised by the British South Africa Chartered Company through the same individual.

I had visited this country, as you know, in 1889 and 1890; I returned there to found an administration in the early summer of 1891. I will try in a few words to sketch out the conditions of the Protectorate, political and otherwise, as I found it when I landed at Chiromo on July 16, 1891. The Lower Shire district was still in the possession of the Portuguese, though it was to be handed over to us in pursuance of the Anglo-Portuguese Convention. This was a marshy country, with only one European occasionally residing at a half-formed station, and with a native population scarcely exceeding one thousand. The country had become almost uninhabited through the raids of certain of the Makololo chiefs and some powerful tribes north of the Zambezi in rebellion against the Portuguese. The Ruo district was fairly quiet, and the town of Chiromo had just been founded, and consisted of five reed houses and one street. In the Mlanje district there was practically chaos. The chiefs of the aggressive Yao tribes (of whom more anon) had taken complete possession of this rich district, the few European planters were menaced in their lives and property, and the only mission station had to be abandoned. In the Zomba district incessant slave-raids were being carried on by a Yao chief named Kawinga. One of these, undertaken in May, 1891 (as stated by the Rev. Horace Waller on good

authority), resulted in the expatriation of over a thousand people. At the settlement of Zomba itself there was just the unfinished Consulate-General and Mr. Buchanan's house hard by. In the Blantyre district matters were more settled, owing to the greater number of the Europeans being established there; but here again the Yao chiefs did pretty much as they pleased, and slave-trading and raiding went on openly. The West Shire district was also in a very disturbed state. The principal chief of the Makololo had been deposed by his brother chiefs, and was fighting with them. There were also constant incursions of the Makanga from over the Portuguese border. On the Upper Shire the slave-traders had things entirely their own way, and traders and European passengers

FIG. 1.—VIEW FROM THE RESIDENCY GARDEN, ZOMBA.

were obliged to pass up and down the river very discreetly, lest by seeming to take any notice of the slave-traders' proceedings they should have the river closed against them by the Yao chiefs. As regards the South Nyasa district, continual warfare was going on between Mponda and Zarafi, two rival Yao chieftains, and also between the Yaos and the Angoni, with the result that the slave-traders from the coast prospered mightily, and slaves to the extent of one to two thousand were exported annually. Mponda, though not unfriendly to the English, used, either personally or through his head men, to levy a tribute from the steamers passing into Lake Nyasa, which was undefined and sometimes oppressive. On the south-east and south-west coasts of Lake Nyasa, Makanjira, the

most powerful of all the Yao chiefs, practically ruled the country, and conducted incessant wars to the west of Lake Nyasa for the purpose of supplying the slave-market. Jumbe's country was quiet except for the attacks of Makanjira, and Jumbe was, I believe, honestly endeavouring to act up to the treaty he had concluded with Her Majesty the Queen, and by degrees to put down slave-trading in his country. Nevertheless, the land was so full of Arabs that his efforts were not of much avail. In the West Nyasa district fighting was continually going on between the Angoni in the interior and the Atonga on the coast. In the North Nyasa district the Arabs had things completely their own way, and were beginning to reconsider the advisability of breaking the treaty of peace which they had entered into with me in 1889. In short, throughout all this country there was absolutely no security for life and property amongst the natives, and not over-much for the Europeans except in districts like Blantyre and West Nyasa, where the missionaries had acquired a strong hold over a section of the population.

Everything had got to be commenced; there was no proper postal service, there were no customs-houses, no roads suitable for wheeled traffic, very little labour in the coffee plantations; the forests of the land were being steadily destroyed year by year by bush fires, and the navigation of the Upper Shire was entirely at the mercy of evil-minded slave-traders.

Our first attempts were naturally directed towards the establishment of something like law and order in the districts more immediately contiguous to European settlements. In carrying out these objects, I was supported by a staff which consisted of Mr. Alfred Sharpe, who had been appointed Vice-Consul and Deputy-Commissioner by Her Majesty's Government; of Captain Maguire, who was lent by the Indian Government; of Captain Sclater, R.E., and three non-commissioned officers of the Royal Engineers, lent by the War Office; of Mr. Alexander Whyte, who came out as naturalist; and of Mr. Vice-Consul Buchanan, together with one or two others engaged in the country, and who afterwards became permanently attached to the Administration. We had a police force of seventy Sikhs and one hundred Zanzibaris. Finally, there were two gunboats—the *Herald* and the *Mosquito*—already placed on the Zambezi, which were instructed to afford me assistance in the transport of my expedition from Chinde to Chiromo. As Chiromo is often mentioned in this paper, I might explain that it is an important place situated at the junction of the river Ruo with the Shire. Above Chiromo both banks of the Shire are British; below Chiromo one bank is Portuguese and the other British. The river Ruo is part of the boundary between the two powers. Captain H. J. King was senior naval officer on the Zambezi, and afforded me very great assistance both on the Lower and Upper Shire.

Our expedition had no sooner landed at Chiromo, on July 16, 1891,

than urgent representations were received from the few planters who had attempted to settle in the Mlanje district. The Yao chief Chikumbu, who had long been giving trouble by attempting to conquer the country from its possession by the indigenous chiefs, had at length menaced the European planters so seriously that all work on their plantations had come to an end. Chikumbu's object was to conquer and enslave the A-nyanja people, who are the original inhabitants of the country. The head chief of the A-nyanja had recently died, and before his death had appealed to Mr. Buchanan, then acting consul, for protection, and on his death-bed transferred his country to the Queen, as the only means of keeping it out of the hands of the Yaos. I accordingly

FIG. 2.—VIEW NEAR MURCHISON FALLS.

despatched Captain Maguire, with a small force of Sikhs, to Mlanje to bring Chikumbu to reason, to remind him of the terms of his own treaty with the English, and to request him to cease annoying the planters, and not to transgress the boundaries of his country already laid down by Mr. Buchanan. Chikumbu, however, commenced by attacking the small force sent to support Captain Maguire, and, as the result, was driven from his country, and his brother installed as chief in his stead. This action may be said to have definitely opened the Mlanje district to European settlement. The Scotch mission was re-established, and numerous planters came and settled on the land, much to the advantage of the natives, who at once began to prosper from the demand for

labour. We had now definitely fulfilled our promise of protection to the A-nyanja people; but in the course of three years we had to fight twice with the Yao chiefs, who dominated the northern part of Mount Mlanje, and who did not give up the slave-trade without a struggle.

Following on this Mlanje expedition came the necessity of taking measures to prevent the carrying on of the slave-trade at the south end of Lake Nyasa. I need not unnecessarily weary you by recounting in detail these operations; I may briefly state that Captain Maguire and myself with 70 Sikhs tried conclusions with the Yao chiefs Mponda, Makandanji, and Makanjira, and completely defeated them. We had started on this expedition with the idea that the only enemy we should have to contend with by force would be Makanjira, but before reaching Makanjira's a conflict was forced on us by Mponda. The result was disastrous to the latter, whose forces, though large, were completely defeated and dispersed by the remarkable military skill and gallantry of Captain Maguire and his small force of Sikhs. As the result Mponda made peace, and we have never had occasion to fight with him since. Captain Maguire built a fort on the uninhabited shore of the Shire immediately opposite Mponda's town, on the south end of the lake, and named it after myself. We then effected a landing at Makanjira's, and, after two days' fighting, captured his principal town and destroyed it, together with three of Makanjira's dhows, which were used in ferrying slaves across the lake. On our return, we exacted from the Yao chiefs on the Upper Shire engagements to put an end to the slave-trade. We were then obliged to turn to Kawinga, a powerful Yao chief living 18 miles to the north-east of the residency at Zomba, to whose extensive slave-dealing I have already made allusion. Kawinga at first refused any concession to our demands, but after losing several of his villages he consented to treat, and, although his behaviour has been far from satisfactory since, at any rate he does not attempt any longer to openly raid the country in the vicinity of Zomba. Unfortunately, we were unable to effect, on that occasion, a complete mastery over Kawinga, owing to Captain Maguire being wounded in action, and the whole of the native porters who were carrying the ammunition bolting, thus obliging Captain Maguire and Mr. Buchanan, who was with him, to effect a retreat whilst the enemy was still in flight.

For awhile it seemed as though the tide of our good fortune had turned. Captain Maguire rapidly recovered from his wound, but insisted on making a hasty trip to the south end of Lake Nyasa to renew the garrison at Fort Johnston. On arrival at that place, however, he received information of the arrival of a large slave-caravan on the south-west coast of Lake Nyasa, which was to proceed to Makanjira's. On going up in the steamship *Domira* to surprise this caravan, he decided first to intercept and destroy Makanjira's two remaining dhows. These vessels had been anchored in shallow water near the main town

of Makanjira's, which we had destroyed a few months before. Captain Maguire would have succeeded safely in his purpose had it not been that a storm arose, which drove his boats from their mooring and dashed them on to the rocks, at the same time driving the *Domira* aground. The attack of the enemy then became overpowering. Captain Maguire and three of his Sikhs were killed; all the Europeans on the *Domira* were more or less wounded; and, as you know, the further tragedy occurred

FIG. 3.—RAPHIA PALMS.

of Makanjira luring the principal engineer and the Parsee doctor on shore under a flag of truce, and then murdering them. After lying for five days on the sandbank exposed to a galling fire on the part of the enemy, the *Domira*, by some happy chance, floated off and managed to steam away. The saving of the *Domira* was mainly due to the remarkable skill and bravery of Mr. Angus Urquhart, a Scotch engineer, who, though severely wounded, worked for five days defending his ship and attempting to get her off the sand-bank.

Shortly after this disaster, all the unfriendly Yao chiefs at the south end of Lake Nyasa rose against us, Mponda alone remaining faithful. To relieve the state of siege in which Fort Johnston was practically placed, Mr. J. G. King and Dr. Watson attempted to make a sally into Zarafi's country, Zarafi being our chief persecutor. The small band of Europeans and Sikhs, however, were attacked by Zarafi's forces in a defile, and only emerged from their dangerous predicament with the loss of six Sikhs, and with all the Europeans severely wounded. This mishap was caused in much the same way as the check at Kawinga's, by a panic ensuing among the native porters. From incidents like these, we came to realize the absolute necessity of the maintenance of a sufficiently strong force of Sikhs to provide against the possibility of similar panics. Negro troops are splendid in *élan* and dash at the onset, but the slightest check will turn a mad rush onward into a frantic panic backwards. It is on occasions like these that the Sikhs are invaluable, as they remain perfectly unmoved, and obey their officer's orders with the same calm precision as they would do on the parade-ground.

I have alluded to our Indian forces under the general term of Sikhs, but I should explain that twenty-two of them were really cavalrymen from the Haiderabad Lancers, and they, being found unsuitable to a country which at that time possessed few or no horses, were sent back to India; so that, what with deaths and wounded men, our active forces were reduced to forty men, supplemented by the hundred Zanzibaris to whom I have made allusion, these latter, however, being employed chiefly as civil police. It became necessary, therefore, to merely hold on to such positions as we had secured, and let our struggle with the slave-traders fall into abeyance. This miserable state of affairs was endured until Her Majesty's Government put three gunboats on to Lake Nyasa and the Upper Shire; and also until our force of Sikhs was so far strengthened as to permit us to definitely take the field against Makanjira and the Yao coalition. Prior to the arrival of this help, however, the slave-trading chiefs on the Upper Shire had broken out into open hostilities, and for one month cut off our communications between Lake Nyasa and the lower river. We had to meet these hostilities with a handful of black police, until such time as a detachment of blue-jackets from the gunboats on the lower river could come to our assistance. We were also helped by Baron von Eltz and the Sudanese belonging to the German expedition. The outcome of this campaign, so unwillingly entered upon, was the complete conquest of the Yao chiefs on the Upper Shire, where there has never since been any further fighting or trouble, and where the old A-nyanja population has resumed its old place in the country. It is interesting, also, to note that our local police force on the Upper Shire is now mainly composed of the very Yaos that we were fighting against only a year and a half ago. There has scarcely been a more amusingly complete instance of the principle of setting a thief

to catch a thief than the turning to account of the warlike instincts of these Yaos. This happy result is largely due to the tact and management of Mr. F. J. Whicker, and to my old Swahili head man, Ali Kiongwe.

The considerable increase to the forces at my disposal enabled me, in the autumn of 1893, to undertake and carry out the complete conquest of Makanjira. We first drove him from the west shore of the lake, which he had recently seized, and then attacked him in his own country and captured every one of his towns in succession, finally reducing him to sue for terms. Since that time his country has been occupied and administered by the British, as the only means of completely suppressing the slave-trade in that direction. A large fort has been built on the site where poor Maguire was killed, and has been fitly named after him Fort Maguire.

This campaign against Makanjira did not, I think, attract from the public at large the attention that it deserved. I am not referring to my own share in the matter, which has probably been over-estimated; I am referring to the really remarkable services rendered by Mr. Alfred Sharpe, Major Johnson, Major Edwards, and Captain Robertson, not to mention more particularly the other Europeans engaged, or the renewed acts of gallantry on the part of the Sikhs. Some of Mr. Sharpe's forced marches and his extraordinary acts of pluck and daring in effecting reconnaissances or in bringing relief at critical times, deserve a special disquisition were it not that they are such common incidents in the records of British officials and naval and military officers, that they excite but a feeble interest on the part of the much-engrossed home public. The successful issue of the Makanjira campaign seems, for the present, to have solved most of our difficulties in Southern Nyasaland. It was followed up by some energetic action on the part of Captain W. H. Manning in the Mlanje district, which resulted in a general peacemaking all round amongst the recalcitrant Yao chiefs. We are, therefore, now left without enemies in the whole Protectorate, with the exception of one or two Arabs at the north end of Lake Nyasa, and Zarafi and Kawinga on our south-eastern border. I have every reason to hope that Kawinga may fall into our ways and give up the slave-trade; but I fear Zarafi will yield to no argument but that of force, though as an enemy he is now contemptible, since he is deprived of the co-operation of Makanjira.

But in the prosecution of this work in our Protectorate, peace had her victories no less than war. Captain Sclater and others have undertaken the construction of a series of admirable roads which are suitable for wheeled traffic, and where waggons are now industriously plying. I do not mean that before our arrival there were no roads in the country, but these roads were little more than widened native paths, and, with the exception of those passing through the town of Blantyre, there were no bridges over the streams.

Courts of justice have been established at Chiromo, Blantyre, Zomba, Fort Johnston, Deep Bay, and many other places. A regular postal service is now in operation, not only throughout the Protectorate, but right away to Mweru and the borders of the Congo Free State. A telegraph-line is being constructed by the African Trans-Continental Telegraph Company, and this, it is hoped, will shortly be completed through from Blantyre to Fort Salisbury across the Shire and Zambezi. In all this task of organization, however, it is by no means the Administration alone and unaided that has done the work. To begin with, the bases of the whole Protectorate were laid years ago by patient missionaries and by one or two dogged Scotch planters, who had a firm belief in the future of Nyasaland and a resolve to be dismayed at nothing, not even utter want of capital. One of the biggest names in this country for all time will be that of John Buchanan, whom Lord Salisbury recommended for a C.M.G. long before his merits were known to the public at large. Mr. Buchanan practically introduced the cultivation of the coffee-tree into this Protectorate, and so laid the foundations of its present prosperity; he also commenced the cultivation of the sugar-cane and the manufacture of sugar, the cultivation of tobacco and the manufacture of cigars; he has made successful experiments in the introduction of the cinchona-tree and the tea-shrub, of various kinds of indiarubber, and latterly has co-operated with the Administration in taking up the cultivation of wheat, which is likely to prove a very great success. In regard to this last-named product (wheat), it may be of interest to describe our own experiments in this matter. We introduced wheat from England and wheat direct from India, but neither proved very successful. It then occurred to Captain Sclater to obtain specimens of the wheat grown on Tanganyika by the French missionaries. This wheat was originally of Indian origin, but had become practically acclimatized to Central Africa. Its introduction into the Shire highlands has been a great and unqualified success. The Administration first planted a small area at Zomba and at Blantyre, and distributed the seed thus gathered in to Mr. Buchanan and to certain of the more enterprising among the native chiefs. The results of these measures, taken under the guidance of our naturalist, Mr. Whyte, have met with a full and ample success, and before long we may reasonably hope to discontinue importing any flour from outside.

The missionaries have, as I once before pointed out, acted as a kind of informal school board for Central Africa, and the results of their years of patient teaching have begun to manifest themselves since we commenced the administration of this country. An increasing number of natives are able to read and write, and, above all, are trained to respect and to value a settled and civilized government. As one or two instances of the really marvellous and encouraging results of this missionary teaching, I may quote the following. The whole of our

Government printing at Zomba, including the production of our Gazette, is done by native printers taught in the schools of the Universities Mission and of the Church of Scotland Mission. The other day my far-sighted colleague, Mr. Sharpe, resolved to try what could be done in the way of creating a staff of native telegraph operators; he accordingly obtained an intelligent boy knowing absolutely nothing of telegraphy, but well taught in other ways, from the Universities Mission. He put this boy under one of the Sikhs who was acquainted with the working of the telegraph, and in six weeks the Sikh had imparted sufficient knowledge to this native to enable him to send

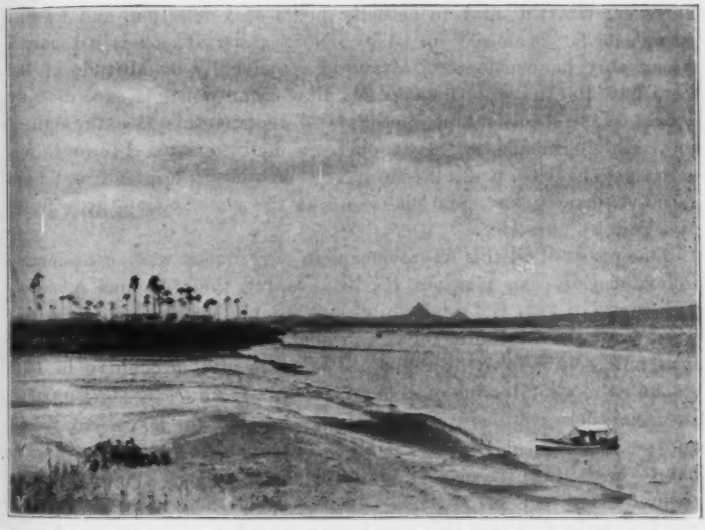

FIG. 4.—A VIEW OF MORAMBALA MOUNTAINS FROM THE SHIRE RIVER.

messages with extraordinary correctness, and to become the telegraph operator at Blantyre.

Amongst other important aids to civilized and comfortable existence, I should mention the introduction of the cultivation of the potato, which is due either to Mr. Buchanan or to the Scotch missionaries, or to both; and in the same way the introduction of orange-trees, lemon-trees, roses, strawberries, almost all European vegetables, and many beautiful garden flowers and shrubs. The Administration also may claim some credit for its attempts, through Mr. Alexander Whyte, to introduce interesting and valuable plants and trees. Mr. Whyte, however, has made his special mark in his botanical discoveries. His name will be handed down to fame in connection with one of the most

interesting conifers in the world, namely, the great cedar of Mount Mlanje, which is called the *Widdringtonia Whytei*. Between the limits of the South Africa region and the highest mountains of Abyssinia (with the exception of some small Juniper bushes on Mount Kenia) there is no such thing as a conifer in Central Africa, except the recent discoveries on the high mountain of Mlanje and on the highest peaks of Abyssinia. In the autumn of 1891, whilst we were fighting on Lake Nyasa, Mr. Whyte was exploring the higher plateaux of the Mlanje mountain mass. A Scotch missionary, now dead, the Rev. Robert Clelland, had reported that there were trees growing in the upper parts of Mlanje which looked like cypresses. Mr. Whyte, however, was the first to actually prove this assertion, and to send specimens for examination. The *Widdringtonia Whytei* is not only a remarkably handsome tree, attaining occasionally an altitude of 130 feet, but its timber, which smells like cedar wood, is exceptionally good. We are now taking measures to replant this tree throughout the Shire highlands, where it once no doubt existed before it was extirpated by bush fires. Seeds have been sent to England and have germinated there, and four plants are at the present time growing at Mr. Veitch's nurseries.

One result of all this improvement in government was a considerable influx of European planters resolved to try their fortune in coffee-growing. In 1891 the total white population of British Central Africa was 57; at the beginning of the present year it had risen to 230, and it is now considerably over 300. The trade of this country in 1891 amounted to a total value of about £20,000. It now exceeds £100,000. In 1891 there were only 8 British steamers on the lakes and rivers, and perhaps 15 barges. There are now 17 steamers and about 120 barges or sailing vessels hoisting the British flag. There were a thousand acres under cultivation at the hands of Europeans in 1891, and it is estimated that this area has increased to eight thousand acres in the summer of this year. Over five million coffee-plants are now growing, and when these come into bearing, as they will before long, there will be ample freight for the railway which it is proposed to construct between the Upper and the Lower Shire. In 1891 there was one Indian trader on British territory; there are now twenty-seven, and some of these men are doing such a prosperous business that they are able to pay as much as £140 for a single town lot. Land, which was selling at from ½*d.* to 3*d.* an acre in the first half of 1891, now ranges in price from 1*s.* to 5*s.*, and in the townships has risen to sums of £100 to £200 for township lots. Since the Administration commenced, four "towns" have been created and eight centres of European settlement have been founded, which before long will have attained, no doubt, to the dignity of townships.

For the past three years we have been at work surveying this

country, and this work has been carried out mainly at the expense of the Royal Geographical Society, who has lent us the instruments. All our principal stations are now protected by forts, and a large native population has sprung up around each of these forts, owing to the complete sense of security they convey. It is remarkable how the very idea of slavery is disappearing from among the indigenous people. It has been throughout most gratifying, the way in which four-fifths of the inhabitants have fought on our side to maintain the principle of liberty. The remaining fifth may be considered to consist of more or less Muhammadanized negroes, who are under the influence of the

FIG. 5.—SCLATER'S ROAD.

Arabs. Many of these are now being weaned from their evil ways, because they are not slow to appreciate the advantages of serving for regular pay in our police force, or of carrying on trades at once more lucrative and honourable than that of kidnapping their fellow-men; but, as I have already pointed out, there are still one or two strongholds of the old *régime*, and I should not like to dwell in "a fool's paradise," or imagine that we are to carry out the steady suppression of the slave-trade by edicts alone.

The chief value of the British Central Africa Protectorate, compared to the adjacent countries, lies in the greater proportion of high land over low swampy country. I should say, roughly speaking, that about four-fifths of its land-surface is 3000 feet and upwards above the level

of the sea, and about one-fifth is between 5000 and 10,000 feet. The immediate result of this elevation of the land is the prevalence of a much cooler climate than is usually found in Central Africa so near the Equator. There are, indeed, easily attained portions of British Central Africa where the heat is never oppressive, even in the hot season, and where in the cold season bitter frosts prevail. Unfortunately, it is impossible to reach this delectable land from the coast without traversing the hot and unhealthy valleys of the Zambezi and Shire, and within the Protectorate itself one must at times descend to the shores of Lake Nyasa or the marshy land around Lake Chilwa, and thereby receive the germs of malarial fever.

There is an average rainfall of 55 inches throughout the Protectorate, but it is not altogether uniform in character, some districts receiving about 75 inches, and others not more than 35 inches. Still, it is decidedly a well-watered country, endowed with many perennial streams, only a small number of which dry up in the height of the dry season. Consequently, it is a land which can almost everywhere be irrigated during the dry season, and can thus grow a continual succession of crops. The water in almost all places is wholesome to drink; in fact, I should say, that among the most charming features of British Central Africa are the innumerable streams of cold clear water, with the umbrageous forests that they give rise to along their banks.

The great attraction of this country lies in its beautiful scenery, in its magnificent blue lakes, its tumultuous cascades and cataracts, its grand mountains, its golden plains and dark green forests. A pleasant and peculiar feature also of the western portion of the Protectorate is the rolling grassy downs, almost denuded of trees, covered with short turf, quite healthy and free from the Tsetse fly; these no doubt will in the future become actual sites of European colonies, districts in which Europeans can rear their children under healthful conditions.

It would be difficult, in the short space of time at my disposal, to give you an adequate idea of all the aspects of Nyasaland scenery, so I will confine myself to briefly describing the salient features of some of the more striking landscapes.

As an illustration of our mountain scenery, let me take Mlanje, a mountain mass which in its highest pinnacles just reaches 10,000 feet. Mists often gather round this splendid range and completely efface it during the first half of the day, so that you may be approaching nearer and nearer to it across the heated yellow plain without being aware of its existence, till all at once the mists are dispelled, and a great blue wall surmounted by peaks and turrets suddenly blots out half the sky. As you look up a sheer seven to eight thousand feet, the effect is very grand. At the base of Mlanje there are many streams and a wealth of vegetation, among which may be seen the beautiful Raphia palms, the wild date, and a curious species of cycad. Ascending through this lush

tropical vegetation—group after group of feathery palms extorting one's admiration—one enters upon a rolling slope covered with high grass about 6 feet high, with stems stout and strong, through which it seems at times almost impossible to force one's way. Then supervenes a belt of tree ferns, more lovely perhaps than any other form of vegetation. There are breaks and open glades between the rows of tree ferns and the ilex forests, which are a red gold with flowers of various *compositæ*, or, in the shadier parts, magenta-coloured with the innumerable balsam blossoms. Then one has done with the lower slopes, and is face to face with an abrupt rocky wall, the ascent of which is quite a difficult bit of Alpine climbing, rendered the more difficult, perhaps, by

FIG. 6.—ZOMBA PEAK, MOUNT MLANJE.

the abstraction of mind caused by the desire to contemplate to the full the blue masses of lobelia and the red wax flowers of the aloes which grow out of the crevices of the rocks. One last frantic scramble, holding on by roots of grass, lands one on the top of a ledge, and then comes the great surprise. One has reached a new country, a "Jack-in-the-Beanstalk" land. Far away stretch rolling grassy plains seamed with the courses of streamlets and diversified by handsome clumps of forest—forest of the temperate regions, with the branches of its trees hung with frosty-looking lichen. This is the upper plateau of Mlanje, a little world in itself, with the exhilarating climate of Northern Europe. These plains and valleys are gay with blue ground-orchids, with a purple iris,

and with yellow everlasting flowers. Here and there great rocky boulders stand up in stern relief against the velvet turf, and out of these elevated plains again rise other mountains, gloomy in aspect and remarkably grand in outline. The forests, on closer inspection, turn out to be mainly composed of the *Widdringtonia Whytei*, the handsome conifer to which I have already made allusion. The only other species of Widdringtonia occurs in some ranges of mountains in the southern part of Cape Colony. I believe the closest relations of this conifer are with the cypresses, but in appearance it is something between a cedar and a Scotch pine.

Here and there on the upper plateau are the most beautiful little tarns, or mountain lakes, while the air is musical with cascades and falling rills of water. As one walks about this tableland and occasionally reaches the edge an awful, yawning gulf will reveal itself, and the eye, after getting accustomed to the abyss, can make out the whole country below spread out like a faint map.

No one has succeeded in reaching the highest summit of Mlanje.* I have been up myself about as far as 9300 feet, and have estimated that there were fully 700 feet more of ascent before me, and I therefore approximately fix the highest point at 10,000 feet. The ascent of this high peak is rendered very difficult by the enormous size of the boulders with which it is strewn. It would seem as though the high peaks of Mlanje constitute ancient craters, from which boulders of all sizes were occasionally ejected and strewn, not only over the surrounding plateau, but over the plain below. The upper plateau of Mlanje is probably part of the ancient plateau, which has been in all directions eroded by the course of rivers. From this tableland must have arisen those volcanoes which to-day constitute the high peaks of Mlanje. The whole mountain mass of Mlanje probably occupies, with its outlying peaks connected by saddles, an area of 1600 square miles, of which 200 square miles consist of these level or gently undulating plateaux, admirably suited for European settlements. Many of the salient features of Mlanje are repeated in the striking mountains of Nyasaland, with the exception of the cedars, which, however, are reported to exist on one or two of the highest peaks of Zomba, but have never been seen elsewhere.

Now, as a contrast, let us in imagination walk over one of the great plains such as border the river Shire along portions of its course, or lie around the salt lake Chilwa, or on the western shores of Lake Nyasa. By the water's edge or at intervals over the plain are dotted groups of acacias and fan palms. The acacia has a smooth, whitish-green bark and a grass-green, close-cropped foliage, interspersed with huge white thorns; its flowers are little puff-balls of golden yellow, and

* See *Geographical Journal*, February, 1895, p. 169, for account of an ascent since this was written.

exhale one of the strongest, sweetest, and most penetrating of flower scents. The fan palm is either a species of borassus or of hyphœne. The trunk is grey, smooth, and column-like; the fronds are often shaped with a slight whorl or twist, and are a cool, blue, glaucous green. The fruit of the hyphœne is a golden brown, and about the size of a closed fist. The borassus nuts are a dark brownish green, and as large as a child's head. The outer covering of the hyphœne fruit has a faint, sweet taste, something like gingerbread. It is much sought after by elephants, who, to obtain it, will drag down palm after palm.

The rest of the plain is high grass—in the summer-time like a waving green sea, with the white plumes of the reeds seeming to be flecks of

FIG. 7.—GORGE IN MOUNT MLANJE.

foam. At this season these plains are almost impassable, except along the beaten tracks; but for seven months in the year the grass is either burnt down and reduced to blackened stumps by the bush fires or dries up into a golden straw, which permits of freer movements. Among these great tufts of yellow grass the tawny lions lurk, and when one is crossing these plains in pursuit of game, it is by no means an uncommon incident for a rush and a scurry to take place in the dry herbage, and for one or several lions to reveal themselves to the startled sportsman.

Under the sparse shade of the acacias or the palms, the black buffaloes will stand chewing the cud and whisking off the flies with their tails. They have usually favourite resting-places near some

mud-hole, where the herbage will be trampled flat, and the ground become like a farmyard. Zebras, hartebeests, water-buck, pallah, roan antelopes, and reed-buck may be found in numbers, and often dwelling gregariously together on these hot plains; and a few vultures, eagles, kites, and Marabou storks wheel and float overhead in the dazzling bluish-white sky, on the look-out for offal. The sable antelope, the eland, the kudu, and the bush-buck seem to prefer the sparsely forested hill slopes to the flat plain, where there is usually much less cover. The rhinoceros still ranges over these plains, and wallows in the stagnant pools of the half-dried rivers.

The heat prevailing on the plains in the summer-time is very great —almost overpowering, but in the winter and spring the air is exhilarating, and in the latter season the thick, rich scent of the acacia is a joy to the senses not to be forgotten.

In spite of their supposed unhealthiness, I am always fascinated by marshes, and nowhere more so than in these parts of Africa where stagnant water is covered with blue water-lilies, and diversified with clumps of apple-green papyrus; where the reed islands are bordered and the narrow inlets blocked by the *Pistia stratiotes*, a huge duckweed of the most vivid lettuce-green, and very like a compact lettuce in shape. The intense verdure of this surface vegetation is thrown up by the occasional gaps of dark still water. There is a pretty little bird—the jaçana, chocolate, cream-coloured, and brownish green—with enormous feet, which runs over the floating lilies and duckweed in search of insects. Large verditer-blue coots,* with red legs and feet, diligently fish from the edge of the bank, while enormous storks wade with long strides in the more open spaces of water. These storks are very striking as seen from a distance, for they are a dark black-green and snowy white in colour, and their huge beaks are crimson with a black bar. The pure white egret, the cream-coloured squacco heron, the slate-coloured heron, the hugo russet giant heron, the dark brown *Scopus umbretta* also frequent these marshes; while innumerable tree-ducks, African teal, Egyptian geese and spurwing geese resort to these impenetrable swamps to lay their eggs and rear their young. If the swamp is connected with a river or lake, then you must walk warily, or you may trip over a huge sleeping crocodile, which has clambered up into the grass to sun itself. Here, too, are found the extraordinary African mudfish, a living link between the fish and the amphibian. In short, an ardent naturalist would be so fascinated by the fauna and flora of a thorough-going swamp in Central Africa, that he would have no time to feel ill from the malaria which it is supposed to cause.

It is an abrupt change from such a scene as this, recalling as it does earlier ages in the world's history before the advent of man, to pass into

* Porphyrio.

one of our European settlements. Here will be seen clean broad level roads, bordered by handsome avenues of trees, and comely red brick houses with rose-covered verandahs peeping out behind clumps of ornamental shrubs. The natives who pass along are clothed in white calico, with some gaudy touch of colour superadded. A bell is ringing to call the children to the mission school. A planter gallops past on horseback, or a missionary trots in on a fat white donkey from a visit to an outlying station. Long rows of native carriers pass in Indian file, carrying loads of European goods, or a smart-looking policeman, in black fez, black jacket, and breeches, marches off on some errand. You will see a post-office, a court of justice, and possibly a prison, the

FIG. 8.—PINE FORESTS ON MOUNT MLANJE.

occupants of which, however, will be out mending the roads under the superintendence of some very business-like policeman of their own colour. The most interesting feature in the neighbourhood of these settlements at the present time is the coffee-plantation, which, to a great extent, is the cause and support of our prosperity. The coffee-shrub, as you know, is a native of Africa, but, curiously enough, is not found wild in Nyasaland, though it is met with in the wild state in the province of Moçambique, in many parts of West Africa, and in Abyssinia. The variety which is cultivated in the Shire highlands was actually introduced from Scotland, having been derived from a small plant sent from Edinburgh Botanical Gardens to Blantyre about sixteen years ago. From this plant, I believe I am right in saying

that the greater part of the five million coffee-trees now growing in this part of Africa are descended, while the original mother tree is still alive in the mission grounds at Blantyre. The climate and soil of Nyasaland would seem to suit the coffee-tree to perfection, and the crops given are unusually large. The picture which I now exhibit to you is the photograph of a tree only three years old in the plantations of Mr. Sharrer, near Blantyre. As yet we have been free from the coffee disease, which, as in Brazil and India, does not appear to be able to penetrate far inland from the coast, though it has already committed ravages in German East Africa and in Natal.

One strong inducement to plant coffee in British Central Africa lies in the abundance and cheapness of the native labour, and this again is quite a recent advantage, and it is entirely due to the establishment of a strong government and the suppression of the slave-trade. When I returned to this country in 1891, the few planters then working there were already considering the necessity of importing coolie labour from India owing to the lack of local workers, for in those days many of the natives, though desirous of coming to work with the European for money, were afraid to proceed far from their homes, in case they should be kidnapped; or, again, were afraid of attracting the attention of oppressive chiefs by accumulating wealth. Such few labourers as could be obtained from the west coast of Lake Nyasa had to be brought down in driblets by the Lakes Company's steamers, because they were afraid to walk overland. The suppression of the slave-trade and the forcible measures taken to restrain the Yao chiefs from making slave-raids, have enabled us to turn to advantage an enormous supply of free labour. Natives will now travel on foot several hundred miles to obtain work in the European plantations, with the certitude that they will be well treated, well paid, and able to return in safety to their homes with the wages they have earned. The increase of the native population of this Protectorate is remarkable. In the Lower Shire district the inhabitants, when numbered by me in 1891, scarcely attained a total of 1000; they now number 10,000, and the hut taxes that they pay exceed £400 a year. In the Blantyre district the native population is almost doubled by immigration and natural increase. In the South Nyasa district, it is estimated that there are ten large villages now existing on the west shore of Lake Pamalombe, where in 1891 there was not a single human inhabitant owing to the ravages of the slave-raiders. With the gradual substitution of monogamy for polygamy, as the teaching of the missionaries bears fruit, with the remarkably fertile soil and the cessation of the slave-trade, it is probable that before long the Protectorate of British Central Africa will become one of the most densely peopled portions of that continent: and this in itself is a source of wealth, because, if we can only induce the black man to till the soil, to labour under the hot sun which debars the European from severe

physical exertion, we shall be able to produce in enormous quantities all the most valuable crops of the temperate and tropical regions.

It would be unfair to leave you, at the close of this address, with the impression that all this present prosperity is solely due to the exertions of the present settlers in British Central Africa, and as the result of the establishment of a firm government. We must never forget that it is based first of all on the work of Livingstone, Kirk, and Elton. Among other of the earlier pioneers also should not be forgotten the name of

FIG. 9.—WIDDRINGTONIA WHYTEI.

Herbert Rhodes, the brother of the distinguished South African statesman, who died from an accident on the Upper Shire after exploring what is the modern Protectorate from end to end. Captain Foot, the first consul, died before he could carry out the schemes he had in hand; but his successor, Lieutenant Hawes, now Commissioner and Consul-General in Hawaii, was one of the ablest men who have entered Nyasaland, and the work he did was good and lasting. Mr. O'Neill, the former consul at Mozambique, laid the foundations of a systematic survey, and

obtained the gold medal of this Society for that and other geographical work; and mention should also be made of Mr. J. T. Last, whose surveys are being incorporated in the new map which is being drawn by Captain Sclater. There is one more recent explorer whose work in connection with Nyasaland should certainly not be overlooked, because it has not only added greatly to our geographical knowledge, but the immediate results of the fatigues and sufferings endured on a long journey to Bangweolo have caused serious injury to his health. I allude to Mr. Joseph Thomson, who in British Central Africa, as in Masailand and in the Niger basin, has assisted to lay the foundations of the three great chartered companies. The very serious break-down of Mr. Thomson's health has obliged him to submit to a temporary exile in Italy, where I am sure he will be followed by the sincere sympathy of this Society. Lastly, I wish to draw your attention to the name of Captain Cecil Maguire, lost all too soon at the outset of a brilliant career. Captain Maguire, though but a young man, had already attracted marked attention in India, where, prior to his embarkation to Africa, he occupied a staff appointment as secretary of the Mobilization Committee in India; but he was otherwise and specially distinguished for his remarkable knowledge of languages and his skill in athletic sports. I will not try your patience by enumerating all his accomplishments, but I would sum up his character by saying that he was almost too good a man to be thrown away on Africa in its present undeveloped condition. And to a certain extent he *was* thrown away, though the country still talks of his deeds, and though he broke the back of the slave-trade in Southern Nyasaland. But he died in a way and at a time which failed to attract public notice or sympathy. It is bad enough to die, but to die nobly and in a good cause and to be forgotten, is a refinement of cruelty on the part of Fate. Therefore it is that I am resolved that, so long as I have a voice and am heard in connection with Central Africa, the name of Cecil Maguire shall always be remembered.

Before the reading of the paper the President said: In her Majesty's Commissioner for the British Central African Protectorate, we have once more amongst us a very old and valued friend. Mr. Johnston is so well known to the Fellows of this Society that I feel any introduction from me is quite unnecessary, therefore without further preface I will request Mr. Johnston to read to us the paper of the evening.

After the reading of the paper, the following discussion took place:—

The President: In Mr. Johnston's most interesting paper, to which we have all listened with feelings of admiration, he has explained to us how the dream in which geographers indulged for nearly forty years has at last been realized by him. I well remember at the Livingstone festival, now thirty-six years ago, how that great man explained to us that, when he left England in 1858, his hope and aspiration was to find, by the Zambezi route, a pass to those highlands which our friend is now administering with such marked ability and success. The most distinguished of the companions of Livingstone on the great occasion when he discovered the Shire river and Lake Nyasa is with us this evening. I will therefore request

Sir John Kirk to open the discussion with some remarks upon Mr. Johnston's paper.

Sir JOHN KIRK: After hearing the interesting account given by her Majesty's Commissioner of the steady advance that has been made in Nyasaland, we must look back upon the time when the three expeditions went out which ended in the discovery of the three great African lakes, one of which flows by the Nile to the Mediterranean, another by the Congo to the Atlantic, and the last of all, the smallest, although 300 miles in length, leads by the Zambezi to the Indian Ocean. The discovery of these three great lakes is entirely due to the initiative of this Society: two of the expeditions referred to were paid for directly by this Society; the other, at the instigation of Sir Roderick Murchison, our President, was sent out by her Majesty's Government, and it was to that one I had the honour to belong.

Great difficulties have been overcome in Nyasaland by the missionaries, who steadily worked at Zanzibar, to which place the first mission was temporarily withdrawn after the death of Bishop Mackenzie. Others in the interior reduced the grammar of the languages and supplied text-books, which now enable those going out to acquire an accurate knowledge at once, without the labour of picking it up as the earlier missionaries and planters had to do after getting into the country. The next great difficulty to be overcome was that of transit. The river and the coast were then in the hands of the Portuguese, who commanded the mouth of the Zambezi, where they not only levied high duties, but imposed vexatious rules; but her Majesty's Government has since obtained the opening up of that river to free navigation of all nations, so goods pass free without paying duty at the coast through to British Nyasaland. On the other hand, the British protection of Nyasaland possesses great advantages, such as free labour, and a docile people, who, in the hands of the Zanzibar Arabs, have supplied the porters who have followed all those explorers who have done good work of late in the country. It was through these Nyasa and Yao people that Burton, Speke, and Grant were able to make their discoveries; they afterwards supplied the staff of Cameron and Stanley. This shows the value these men are now likely to be to us in the British Protectorate. Another great advantage which Nyasaland possesses is in being the natural high-road of trade into the interior. Hitherto the trade of the west of the Congo State has passed through the German East African ports, where duties are put upon goods imported of upwards of ten per cent., and fifteen per cent. on ivory coming out. These duties are in addition to any that may be collected by the Congo State, and will now not be paid, because the road through Zambezia allows the ivory and produce to pass down free of all duty to the Indian Ocean, whence they can be exported; so also with imports, which pass free in transit. This must secure to Nyasaland the carrying trade of the interior west of the Congo State; nor will the Congo State look upon this as a disadvantage, for duties will be paid to that State alone on the arrival of goods at the frontier, and on produce before it passes out. Further, Nyasaland possesses a healthy climate and a rich soil. Mr. Johnston mentioned an interesting fact that the wheat received and grown by the French missionaries on Tanganyika had succeeded better in Nyasaland than the Indian and European wheat. Now, this is but natural, for the wheat referred to was not taken there by the French missionaries; it has been cultivated in Central Africa for forty years by the Arabs. Captain Burton mentions that at Unyanyembe, on his first arrival in 1857, he was supplied with wheat grown by the Arabs. It was originally obtained by them from Muscat, and that is, no doubt, the origin of the seed-wheat now grown at Blantyre successfully. There is one other point Mr. Johnston mentions regarding the discovery of cypress trees in Mount Mlanje. I think he rather overestimates the scientific importance of this

discovery, not commercially, but scientifically. The conifers here found are better represented further north near the equator, not by stunted bushes as stated by Mr. Johnston, but by large trees that Captain Lugard describes as upwards of 100 feet high, with a bole 5 feet in diameter, and straight for 50 feet like a ship's mast. These occur in Laikipia in British East Africa, where we find the juniper from Abyssinia, a large tree over 100 feet high, with wood very much like cedar, growing alongside of the Podocarpus, a conifer of the Cape. It is not on the Mlanje mountains, but further north, that the mixing of the two floras occurs in Eastern Africa, in the district between Kenya and Kilimanjaro; there we find distinct types from the Cape mixing with others from Abyssinia. At this late hour I will not detain you with any further remarks, but congratulate Mr. Johnston in being able to give so satisfactory an account of his administration of the country.

Mr. Whyte: With reference to the Widdringtonia found on the Mlanje mountains, I may say it is a tree which very much resembles the Scotch fir; it grows very tall—about 150 feet high—with a stem of a diameter of 6 feet at the ground. It has proved to be very good workable timber, and our Commissioner had quantities of tables, chairs, and other furniture made from the wood at the Residency, Zomba. It also has a very pleasant scent, and while the cuttings are used as firewood in the grate, the odour in the room is very pleasant. It resembles in colour a good deal the pencil cedar, although not quite so dark, but with very much the same grain, and equally easily worked. I may also mention I discovered another conifer in Mount Mlanje of a smaller and trailing habit. I did not succeed in procuring the seed-vessels or cones of that species, but hope to do so soon; it is similar to the *Widdringtonia Whytei*, but more delicate. The wood of it is of comparative little value, as it grows to no great size. In exploring the upper plateau of Mount Mlanje, which Mr. Johnston has so well described to you, I found the flora to be of a most interesting character, and the collections sent home were found to contain a large percentage of genera and species new to science. Unfortunately, it is only during the dry season of the year that much exploring can be done in the mountains, on account of the extreme moisture and high grass in the rainy season. When I return again and my health permits, I shall try to do as much more collecting as I can, and, I hope, with good results.

Rev. Horace Waller: I can only add more congratulations to those which have been offered to Mr. Johnston, who is able to-night, in the presence of some of his staff, to recount to us the wonderful way in which Livingstone's predictions and hopes have all been fulfilled. Of course, recollecting our objects in going into that country, one puts in the foremost place the reduction of that terrible slave-trade which hitherto has been the bane of the whole of that land. One observation of Mr. Johnston's certainly made me take heart of grace. When I was in the Nyasaland myself, some thirty years ago, and we had occasion to try and stay in a small degree the ravages of the Yaos, I always gave and stuck to the opinion that, as British power solidified, so it would be a very easy thing to get from the ranks of the Yaos and A-nyanja a sufficient force to protect their own country. If the Arabs were to beat us to-morrow, they would go to the Arabs; they turn to the rising sun, but they are now quite 'cute enough to see that progress is on the side of the British, and I am sure this will continue. They are only waiting for the 'steel head to the lance.' Troops can be raised in the country for its development. There is another thing to be done by the British Government; it can gather courage from what has taken place in this Protectorate. Mr. Johnston has shown us that abundant free labour is to be had by kindly treatment and the offer of protection to the labourer. I do hope, before many months are over, that the imploring voice of those who have spoken to her Majesty's ministers on this subject will gain its proper

hearing, so that Arabs who go into Africa from the Zanzibar Protectorate, and the natives who go to and fro between Zanzibar and the interior, will soon be able to say that the English are now dead against slavery in every shape and form.

The PRESIDENT: In commencing his paper, Mr. Johnston alluded to the importance of the measures taken by this Society for the advancement of geographical knowledge, and how our strenuous efforts often led to increased political interest being taken in the countries which otherwise would be only half known or remain unknown. That is no doubt true. It is, however, to those gallant explorers who have done the work of the Society in little-known regions that the success of our efforts is mainly due, and amongst the highest in merit, of those now living, certainly our friend Mr. Johnston stands in the front rank. To him, therefore, our warmest thanks are due, both for the great work he has done in Africa, and for the pleasure he has given us this evening. I see that the vote I am now proposing is carried by acclamation; but I also feel that Mr. Johnston would not forgive me if I did not include in the vote of thanks the names of his brave and able coadjutors, Mr. John Buchanan, Mr. Whyte, Mr. Sharpe, Captain Sclater, the civilizer or road-maker (for I look on the terms as synonymous), and the others. In conveying to Mr. Johnston the thanks of this great assembly for his interesting and able paper which has given us so much pleasure this evening, I am glad to couple with his name those of the coadjutors who assisted him.

Mr. JOHNSTON: You have listened with such kind and protracted attention that I will not detain you any longer, as I am afraid my paper has been rather a long one. I receive with the greatest pleasure and satisfaction your thanks, because I know, in consequence of what our President has said, they are not by any means directed wholly and solely to myself, but I can transmit them not only to my colleagues in London, but those labouring out in Central Africa. I hope before long to go back to the scenes of my three years' work, and perhaps when I once more return, I may be allowed to come before you again and give you further information.

APPENDIX.

NATURAL HISTORY OF THE BRITISH CENTRAL AFRICA PROTECTORATE.

In pursuance of arrangements effected before Mr. Johnston left England, all the specimens of natural history collected for Mr. Johnston by Mr. Alexander Whyte, F.Z.S., and his assistants were sent home to Mr. P. L. Sclater, F.R.S., Secretary to the Zoological Society of London, to be unpacked and sorted. This having been done, the contents were submitted by Mr. Sclater to various specialists for examination and report. A list of these reports is appended.

A complete set of the whole of the objects in the various collections was assigned to the British Museum (Natural History). The duplicates were presented to the Museum of Science and Art, Edinburgh, and other institutions, or disposed of in other ways.

The Mammals were examined and reported upon by Mr. Oldfield Thomas, F.Z.S., of the British Museum (Natural History).

Mr. Thomas's reports are—

1. "On Mammals from Nyasaland," *P.Z.S.*, 1892, p. 546.

2. "On a Second Collection of Mammals sent by Mr. H. H. Johnston, C.B., from Nyasaland," *P.Z.S.*, 1893, p. 500.

3. "On the Mammals of Nyasaland: third contribution," *P.Z.S.*, 1894, p. 136.

Some skins of Mammals obtained by Mr. H. H. Johnston, C.B.; Lieut. B. L. Sclater, R.E.; Messrs. Buchanan Bros.; and Mr. A. Whyte, F.Z.S., in the Shire Highlands, were also exhibited to a meeting of the Zoological Society of London, and reported upon by Mr. Sclater (see *P.Z.S.*, 1893, p. 506).

The Birds were examined and reported upon by Captain G. E. Shelley, F.Z.S. His reports are—

1. "List of Birds collected by Mr. Alexander Whyte, F.Z.S., in Nyasaland," with a preface by P. L. Sclater, Ibis, 1893, p. 1, plates i.–iii.

2. "Second List of Birds collected by Mr. Alexander Whyte, F.Z.S., in Nyasaland," Ibis, 1894, p. 1, plates i., ii.

3. "Third List of Birds collected by Mr. Alexander Whyte, F.Z.S., in Nyasaland," Ibis, 1894, p. 461, plate xii.

The Reptiles, Batrachians, and Fishes were examined and reported upon by Dr. A. Günther, F.R.S., of the British Museum (Natural History). Dr. Günther's reports are—

1. "Report on a Collection of Reptiles and Batrachians transmitted by Mr. H. H. Johnston, C.B., from Nyasaland," *P.Z.S.*, 1892, p. 555, plates xxxiii.–xxxv.

2. "Second Report on the Reptiles, Batrachians, and Fishes transmitted by Mr. H. H. Johnston, C.B., from British Central Africa," *P.Z.S.*, 1893, p. 616, plates liii.–lvii.

The Mollusks were examined and reported upon by Mr. Edgar A. Smith, F.Z.S., of the British Museum (Natural History). Mr. Smith's report is—

"On a Collection of Land and Freshwater Shells transmitted by Mr. H. H. Johnston, C.B., from British Central Africa," *P.Z.S.*, 1893, p. 632, plate lix.

The Insects were examined and reported upon by Mr. C. J. Gahan, M.A., and A. G. Butler, of the British Museum (Natural History). Their reports are—

1. "On a Collection of Coleoptera sent by Mr. H. H. Johnston, C.B., from British Central Africa," by C. J. Gahan, M.A., *P.Z.S.*, 1893, p. 739.

2. "On Two Collections of Lepidoptera sent by H. H. Johnston, Esq., C.B., from British Central Africa," by Arthur G. Butler, PH.D., F.L.S., F.Z.S., *P.Z.S.*, 1893, p. 643, plate lx.

The Plants were submitted to the Botanical Department of the British Museum. The report on them, drawn up by the officers of that department, has been published by the Linnæan Society. It is entitled as follows:—

"The Plants of Mlanji, Nyasaland, collected by Mr. Alexander Whyte, F.L.S., and described by Messrs. Britten, E. G. Baker, Rendle, Gepp, and others," with an Introduction by William Carruthers, F.R.S., F.L.S., *Trans. Linn. Soc.*, Lond., ser. 2 (Botany), vol. iv. p. 1, plates i.–x. and map (1894).

SOME SHORT NOTES ON THE GEOLOGY OF MLANJE.

The greater portion of the mountain mass is gneiss varying much in colour, texture, composition, and hardness, and in some places, especially to the south-west, it is overlaid by a coarse laterite (which is supposed to be a derivative from the gneiss), and an iron conglomerate held together by ferruginous matter. The gneiss, as far as I saw, does not approach syenite in colour so much as it does in the region of the cataracts, where it almost approaches the colour of Peterhead granite.

The action of the water in many places, especially the portion under the peak, on the left bank of the Lichenya stream, has decomposed the felspar, and that part of the mountain shows many indentations in consequence.

Unlike other countries where gneiss predominates, limestone does not appear to exist (or, I should rather say, has not yet been lighted upon), and the soil at the base of the mountain gives evidence of its absence.

On the south-west slope and base of the mountain, and continuing to the north-west, unstratified basaltic rock is very prominent, especially where the Lichenya stream has scoured away the mass of *débris* which at one time covered it. In several

of the beds of the streams, if the basalt were cut down perpendicularly, one might expect to see a form of structure almost approaching the columnar.

On the edge of the plateau at the most southern corner there are two small craters about 60 feet deep, and below, some 3000 feet, are the traces of a comparatively late eruption. Large pieces of lava, and in places scoriæ, are to be seen in the beds of the streams immediately beneath the two craters.

Outside the visible line of the basalt hematite iron occurs in a series of low flanking hills, and is of very pure quality, the natives simply smelting and hammering it between two stones preparatory to forming it into garden hoes, knives, etc.

The valley of the Tuchilla is the only part of the mountain that I am acquainted with which I could reconcile the glacial action to having taken place. The bed of the stream (which is here at its best only a mountain torrent) is polished smoothly to a much greater width than ever the water-action could have spread to. At many points are to be seen "perched" blocks, and at the foot of the valley is an unmistakable moraine, which the stream has cut a way round to the eastward. On digging in this low hill, I found it to consist mostly of detritus and flat polished stones. I cannot, however, say that I noticed any signs of striation in the bed or along the sides.

T. H. Lloyd.

Blantyre,
September 29, 1894.

NOTE ON MAP TO ACCOMPANY MR. H. H. JOHNSTON'S PAPER.*

This map is based on the following astronomical points taken by Mr. Sharpe and former travellers:—

	Lat. S.	Authority.	Long. E.	Authority.
	° ′ ″		° ′ ″	
Blantyre	15 47 10	{O'Neill / Sharpe}	35 3 54	O'Neill
Zomba	15 22 40	Last (Mean of 16 obs. Last, Sharpe 1 ob.)	35 17 45	Sharpe
Chipoka's	16 2 30	O'Neill	35 39 57	O'Neill
Chikwawa	16 1 56	Sharpe	34 53 20	Sharpe
Chiromo	16 30 57	Keane	35 9 41	Keane
Dikiri	15 40 59	Sharpe	34 40 6	Sharpe
Matope	15 22 15	Stewart	34 56 9	Stewart
Mpimbi	15 15 37	Sharpe	35 2 20	Sharpe
Fort Johnston	14 26 34	Sharpe	35 10 0	Last
Livingstonia	14 2 37	Last	34 47 10	Last
Kalawili's	13 22 0	Sharpe	34 44 0	Sharpe and O'Neill, corrected as under
Bandawi	11 55 0	{Mean of Sharpe, O'Neill, and Stewart}	34 8 22	"
Karonga	9 56 20	{Sharpe / MacEwan}	33 54 0	"

The following new latitudes by Mr. Sharpe have also been used: Liwondi, 15° 0′ 30″; Zoa, 16° 18′ 22″; Mkanda, 15° 53′ 44″; Fort Lister, 15° 48′ 52″; Pamalombi Crossing, 15° 30′ 51″; Nyaserera's Town, 15° 41′ 40″; Mvera, 14° 47′ 39″; Makanjira, 13° 40′ 28″; Ruawe, 11° 6′ 37″.

* By Lieutenant B. L. Sclater, R.E.

The Shire river below Chiromo is taken from the Admiralty chart by Captain Keane, R.N.; from Chiromo to Chikwawa, from a sketch by Mr. H. H. Johnston, C.B.; from Chikwawa to Matope, from a survey by Mr. Lloyd, Surveyor, B.C.A.A.; from Matope to Fort Johnston, from a sketch by Mr. Johnston. Two routes of Mr. Johnston are used—from Matope to Blantyre, and from Mpimbi to Zomba. Mr. Last's routes from Blantyre to the north of Mlanje and round the east of Lakes Shirwa and Chiuta are used; the remainder of the detail in the Shire highlands is worked in from a compass sketch by Mr. B. L. Sclater. On the west of the Shire, the Lower Shire province is from a sketch by the late Mr. Peel, of the Administration; the telegraph-line, from a route by Mr. Bowhill; the Mwanza river, by Mr. B. L. Sclater. The Portuguese territory to the west is taken from a map by M. Foa, of the Central African Company; Mr. Scott Kerr's route being worked in from Tete to Lake Nyasa, and also Mr. Sharpe's route from Matope to Undi. Mr. Last's route and observations from Mpimbi to Livingstonia and Mponda, are laid down as given by him. The detail of the west shore of Lake Nyasa is laid down as given by the late Mr. Stewart, C.E., based upon the astronomical positions given above. The country to the west of the southern half of the lake is taken from Mr. Joseph Thompson's map as compiled by Mr. Ravenstein; Mr. Sharpe's route from Kazembi's to Mpeseni's is worked in; to the west of the northern half of the lake, Mr. MacEwan's route as given by Mr. Ravenstein in the *Scottish Geographical Magazine*. To the north of the lake the detail is taken from a sketch by Dr. Merensky. The east of the lake as far south as lat. 11° is taken from Mr. Ramsay's map published in the *Mitt. Deutsches Schutzgebieten*. The rest of the east coast is taken from Mr. Stewart's map published in *Proceedings* R.G.S., 1880, from the work of Messrs. Laws and Cotterel; and the interior to the east of the southern portion of the lake, from Mr. Last's map in the *Proceedings* R.G.S., 1890.

Explanation regarding New Longitudes.

Mr. Sharpe's longitudes on the lake are all referred to Fort Johnston, as he has not sent home ratings of his watch after his return to Blantyre. The longitude of Fort Johnston is fixed by Last's observation of Mponda. Sharpe makes it 6 miles to the east of Last, but as Last's position agrees with bearings of Mount Zomba and other points taken by Mr. Johnston, his longitude has been taken. By deducting 4′ from O'Neill's positions for the lake, it makes them agree almost exactly with Last's position for Livingstonia, and also with Sharpe's position for Bandawi and Karonga, based on Last's position for Fort Johnston, as under :—

		°	′	″	
Mponda,	Last	35	8	39	
Fort Johnston,	1½ miles east	35	10	0	
	Sharpe	35	16	0	Difference 6′
Livingstonia,	Last	34	47	10	
	O'Neill	34	51	13	Difference 4′ 3″
Bandawi,	Sharpe	34	14	30	
		34	8	30	Difference 6′
	O'Neill	34	12	18	
		34	8	15	Difference 4′ 3″
	Take	34	8	22	Mean of corrected longitude
Karonga,	Sharpe	33	59	30	
		33	53	30	Difference 6′
	O'Neill	33	58	25	
		33	54	22	Difference 4′ 3″
	Take	33	54	0	Mean of corrected longitude

A PRE-COLUMBAN DISCOVERY OF AMERICA.*

By H. YULE OLDHAM, M.A.

It is unnecessary to point out to an audience of geographers the vital importance of the discovery of America, especially in its effect on our own islands. An apology is perhaps needed for venturing to say anything fresh on a subject which has so often and so ably been discussed.

To find anything new in a mine as energetically searched as this has been, might seem impossible; to assert that there was an entirely new vein to work at would seem, I fear, presumptuous. And yet a different angle of vision frequently shows surprising effects. It was long before the discovery was made that by the mere action of a prism a ray of apparently colourless light could be resolved into the varied hues of the rainbow; and there are still to be found in the East mirrors of metal, which, though seemingly plain and valueless, yet, when held in particular wise, reveal astonishing designs.

To be explicit at the outset, the object of this paper is to bring forward evidence in favour of a discovery of America by the Portuguese some forty-five years before the date of the famous first voyage of Columbus. While claims to the honour of the discovery of America have been made on behalf of representatives of many countries, ranging from China down to Wales, it is strange that none should have been urged in favour of the Portuguese; and yet there is a strong inherent probability that, in the course of their exploration of the West African coast, they must have reached the New World.

To use a knowledge of present conditions in speculating on past probabilities is never unprofitable.

Let a map of the Atlantic, as we now know it, be examined, and it at once becomes evident that there are three points in the New World which are especially accessible from the old. They are (1) *Canada*, by the easy stepping-stones of Iceland and Greenland; (2) *The West Indies*, with the aid of the steady north-east trade winds; (3) *Brazil*, which is not only the nearest point, but has the additional advantages of winds and currents tending in its direction.

It was by the *first* of these that the Norsemen reached America at the end of the tenth century.

The *second*, which was utilized by Columbus towards the close of the fifteenth, seems—to judge from tradition and the records of contemporary maps, showing large land-masses as far west of the Azores as they are west of Europe—to have served others in the early part of the same century. The evidence for this is chiefly in connection with the island

* Report of paper and discussion at the Royal Geographical Society, Technical Meeting, November, 1894.

named Antilia. This island, which first appeared as a somewhat rectangular parallelogram on maps early in the fifteenth century, and on

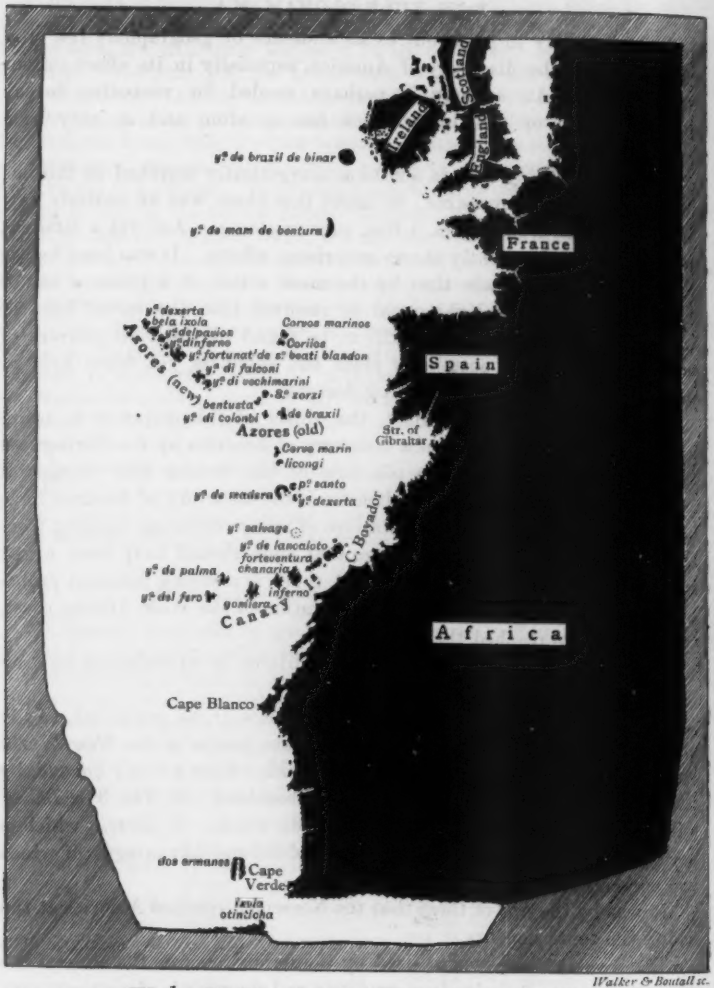

FIG. 1.—SKETCH OF MAP BY ANDREA BIANCO, A.D. 1448.

one by Beccario dated A.D. 1435,* in conjunction with others, is labelled

* A reproduction of this map is given in the first edition (1875) of 'Studi biografici e bibliografici,' by Uzielli and Amat di S. Filippo. Humboldt mentions an earlier map at Weimar, to which he gives alternately the dates 1424 and 1425, on which Antillia is shown, but it has not been reproduced.

"Islands newly discovered," became subsequently identified with an old Portuguese tradition of an unknown land in the West, where seven cities were founded in the eighth century by an archbishop and six bishops, who had fled from Europe before the invading Moors. In this form, as the island of seven cities, Antilia kept its place on maps throughout the fifteenth century, until its name and identity became merged in the Antilles.

But that, though interesting, is another matter. It is to the *third* route, from Africa to Brazil, that I wish to draw particular attention.

This, though the shortest and easiest, was practically not available until the West African coast had been explored as far as Cape Verde, and that was not done till near the middle of the fifteenth century, the credit of the achievement being due to the Portuguese, and especially to that most remarkable man Prince Henry the Navigator, the fifth centenary of whose birth was celebrated this spring.

It was in or about the year 1443 that, after a quarter of a century spent in unwearied efforts along the inhospitable edge of the Sahara, inhabited regions were reached to the south of that desert. Two years later, in 1445, Cape Verde was for the first time rounded.

In the following year the Gambia was reached, and thus within the space of only three years the whole of the rich coast of what we now call Senegambia was laid open to Portuguese commerce.

The result was an outburst of wild enthusiasm; every one seems to have been anxious to share in the riches of the new-found lands. Thus fleets of as many as ten and fourteen ships sailed in a single year, where for twenty-five years but one or two had been with difficulty despatched by the strenuous efforts of Prince Henry.

With so sudden a development there is every probability of much inexperience on the part of some who participated, and few things are less unlikely than that one of these ships, manned by inexperienced sailors, and sailing in little-known waters, should have been driven in a storm out to sea, and ultimately carried on to the coast of Brazil.

This is no mere rash conjecture. It was thus that, but a few years later, the Venetian Cadamosto, sailing under the patronage of Prince Henry to the Gambia, was caught in a storm when trying to round Cape Verde, and driven on to the Cape Verde Islands. And it was thus that the Portuguese Cabral, when trying with a well-equipped fleet to follow the route to India round the Cape of Good Hope, opened up by Vasco da Gama, was actually carried on to this very coast of Brazil.

What happened to Cabral in 1500 may well have happened to others at an earlier date; in fact, as soon as ships began to round Cape Verde.

That cape, as has been said, was first rounded in 1445. There is strong reason to believe that within three years of that date Brazil was reached. The evidence is to be found on a remarkable manuscript map,

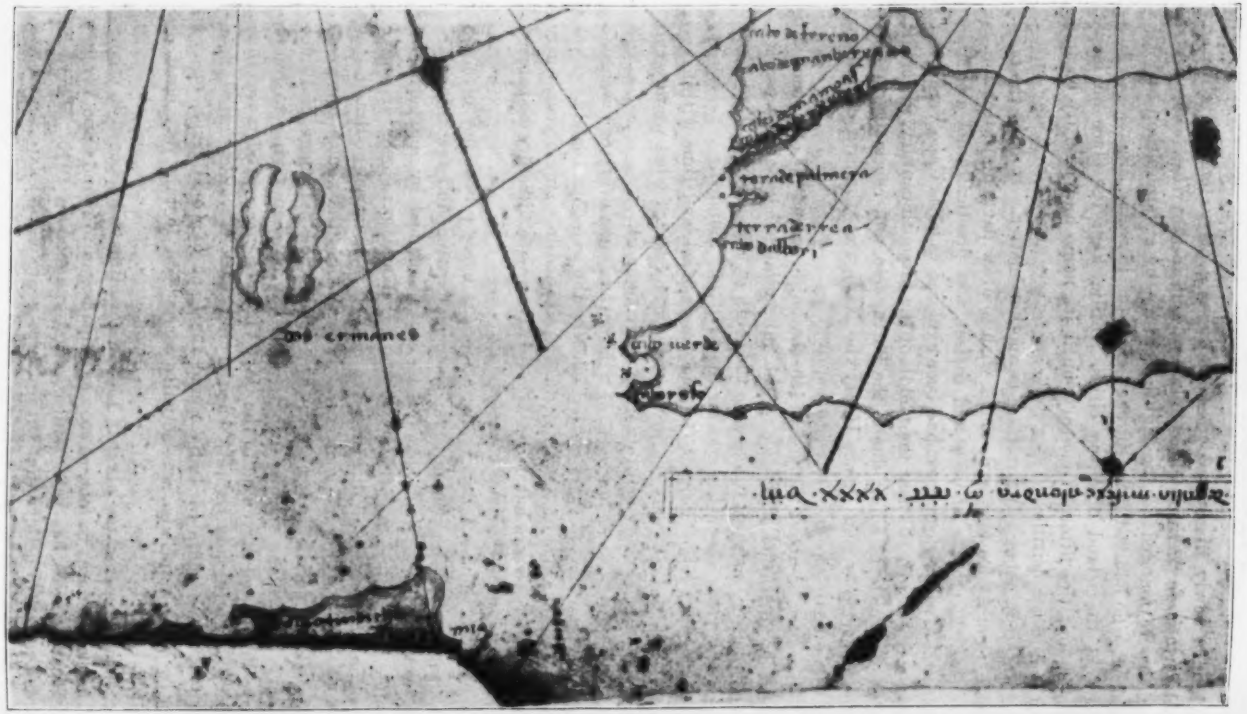

FIG. 2.—PORTION OF ANDREA BIANCO'S MAP, A.D. 1448.
(Natural size, from Photograph specially taken by kind permission of the Curator of the Ambrosian Library.)

now in the Ambrosian Library at Milan, but originally drawn by Andrea Bianco of Venice in the year 1448, in London.*

Without venturing on a discussion of the interest and importance of the early manuscript maps, a subject which has been far too little studied in this country, it may be noticed that they can roughly be divided into two classes—(1) planispheres, (2) portolani.

The two are, as a rule, widely different. The former, circular in shape and fanciful in conception, attempt to represent the whole of the known world by the light of monastic tradition. Jerusalem occupies the centre, Paradise graces the top, while the rest is adorned by sketches of more or less fabulous creatures.

The latter, the portolani, are to these as a scientific treatise is to a work of fiction. Made by practical men for practical purposes, by seamen for seamen, they are usually confined to the shores of the Mediterranean and adjacent seas, and are of an astonishing accuracy. It is to this class that the map in question belongs.

A single glance, however, suffices to show that in one respect it is exceptional; whereas, in almost all other maps of the same kind, the Mediterranean is the most important feature, here it is altogether absent. The map is confined to the western shores of Africa and Europe, and accordingly has the N.–S. direction along the length of the parchment on which it is drawn, and not, as was usual, across the breadth.

The draughtsman of the map, Andrea Bianco, is perhaps the best known of the rare cartographers of the earlier portion of the fifteenth century, for we possess a set of maps made by him twelve years before this 1448 map, and he is said to have assisted in the construction of Fra Mauro's great map, which was finished eleven years after that date.

A comparison of the 1448 map with the earlier one from the same hand, made, as has just been mentioned, in 1436, shows no difference with regard to the European coasts, save a slightly better acquaintance with the British Isles. It is in the African portion that the cartographer had new information to reveal. Here, for the first time on any map that is as yet known, are shown the results of the Portuguese discoveries down to Cape Verde. The then recently rediscovered Azores are also shown for the first time, in the place of the island of Antilia marked on the earlier map.

These novel features would alone serve to render this map remarkable, but it is made unique by something else, for at the lower edge of the map, south-west from Cape Verde—that is, in the direction of

* Press mark, F. 260, Inf. It is of large size, 86 cm. × 63 cm., and coloured in the usual way. It shows several signs of having been made somewhat hastily. The signature is in its usual position across the neck end of the parchment, which is in this case to the south, and not, as commonly, to the west.

Brazil—there is to be seen a long stretch of coast-line, with this singular inscription in the Venetian dialect: "ixola otinticha," that is, *authentic* or *authenticated island*. It is difficult to believe that this can refer to anything but Brazil.

There is nothing of the conventional form or vague name, as in the case of "Antilia," but a definite attempt to show a coast-line, with the emphatic addition that it is "genuine."

Owing to lack of room on the parchment on which the map is drawn, only a corner of this island is shown, on the very edge of the skin, but

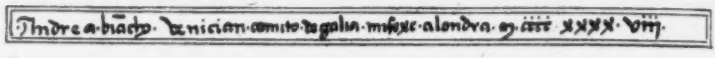

FIG. 3.—SIGNATURE OF ANDREA BIANCO'S MAP.

still much closer to Cape Verde than Brazil actually is. As if, however, to prevent any misconception, the cartographer has added under the words "ixola otinticha," the qualifying statement, "xe longa a ponente 1500 mia." Giving "longa" its ordinary meaning, "long," this would read, "is 1500 miles long to the west," which would be somewhat pointless.* But if "longa" be taken in the sense of "distant," which in mediæval Italian it had, this very pointed meaning is obtained: *authentic island is distant* 1500 *miles to the west.*

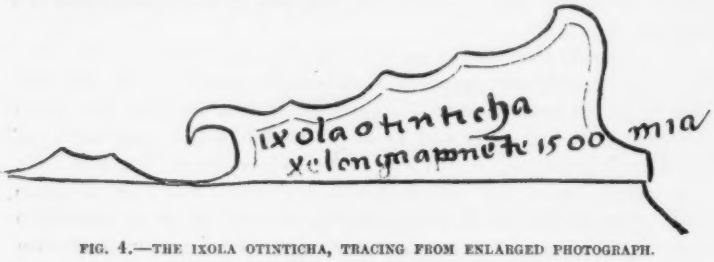

FIG. 4.—THE IXOLA OTINTICHA, TRACING FROM ENLARGED PHOTOGRAPH.

This not only explains the position given to the island on the map, but also the reason for adding a note of the kind, which on such maps is quite exceptional. It is as much as to say, "There is really some land south-west from Cape Verde, but, lest you should imagine that it is as close as lack of space compels me to draw it, I must add that it is distant 1500 miles to the west." The map in question is not altogether

* "Longa" is the Venetian form of "lunga." Petrocchi ('Novo Dizionario,' Milan, 1891) gives "lontano" for the meaning of "lungo" in mediæval Italian: and Tommaseo and Bellini's great dictionary has many instances of "lungo" used in this sense of "distant." There are two good reasons for not translating "longa" as "long," besides the comparative pointlessness of the legend when taken with that meaning: (1) the extreme improbability of 1500 miles of a new coast-line having been explored in one voyage; (2) the clumsiness of the expression, which would require the insertion of the words "from the east" to read properly.

unknown, and is now accessible in the invaluable series of photographs of old Italian maps edited by Professor Fischer of Marburg.*

The importance, however, of the portion to which I have drawn attention has been hitherto overlooked, or, it seems to me, misunderstood. I have met with only three attempts at explanation, and of these two are confined to conjectural emendations of the inscription.

Canale † reads the first letter *a* instead of *i*, and interprets, "è la sola otinticha," that is, "is the only genuine," the meaning of which is not clear, but is rendered plainer by the bold conjecture of *Desimoni*,‡ who, by adding a couple of wholly imaginary words, "questa carta," makes it read, "This map is the only genuine one"! In each of these cases the second line is read as I have given it, but no interpretation offered.

Even Professor Fischer, misled apparently by the Venetian form *xe*,§ of which he takes the first letter to be the Roman symbol for 10, finds himself under the necessity of supplying a word like *larga*, "broad," and accordingly interprets thus: "Genuine island, X miles broad, stretching 1500 miles westwards."‖

Of the coast-line itself Professor Fischer's explanation, which is the only one I have seen, seems inadmissible. His conjecture is that it represents the appearance of the Cape Verde Islands to the hasty glance of an early explorer. Not only is it by no means in the position of the Cape Verde Isles, but the definite wording of the legend, especially if Professor Fischer's reading be adopted, precludes such an explanation. There are, moreover, shown approximately in the position of the Cape Verde Isles, two conventionally drawn islands, with the vague title "dos ermanes," which might well represent the record of a hasty glimpse of some of the Cape Verde Islands, caught by a vessel driving by them towards Brazil.¶

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* Published by Ongania of Venice.

† M. G. Canale, 'Storia del Commercio dei viaggi delle scoperte e carte nautiche degl' Italiani,' p. 455. Genoa, 1866.

‡ In *Atti della Societa Ligure di storia patria*, 1864, vol. iii. p. cxiv.

§ Bianco uses the same Venetian form, *xe* for *è*, on his earlier 1436 map—"questo xe mar de spagna," etc.

‖ Fischer, 'Sammlung mittelatterlicher Welt-und Seekarten italienischen Ursprungs,' p. 209. Venice, 1886.

¶ Mistakes in latitude were rarely made. The "ixola otinticha" is distinctly south, while the Cape Verde Isles lie slightly north of the latitude of Cape Verde. The two islands named dos ermanes, "two brothers," are, in their conventional shape and vague name, a marked contrast to the "genuine island." It is noteworthy that when Cadamosto was driven on to the Cape Verde Isles in 1456, *two* were conspicuous at some distance, and only on landing were the other islands seen from a mountain-top.

There is much evidence to show that the fifteenth-century navigators could reckon differences in longitude with greater accuracy than is commonly supposed, and in this connection the distance given, "1500 miles," is of some interest. An inscription on Bianco's 1436 atlas shows that he used the scale of 56⅔ miles to a degree. The distance

"Is there no record of the voyage which resulted in so remarkable a discovery?" one naturally asks. Possibly there may be, but it must be remembered that contemporary records of the period are very scarce, and such knowledge was jealously guarded. There is, however, in 'The Discoveries of the World,' written by Antonio Galvão in the middle of the sixteenth century—an excessively rare book, but rendered

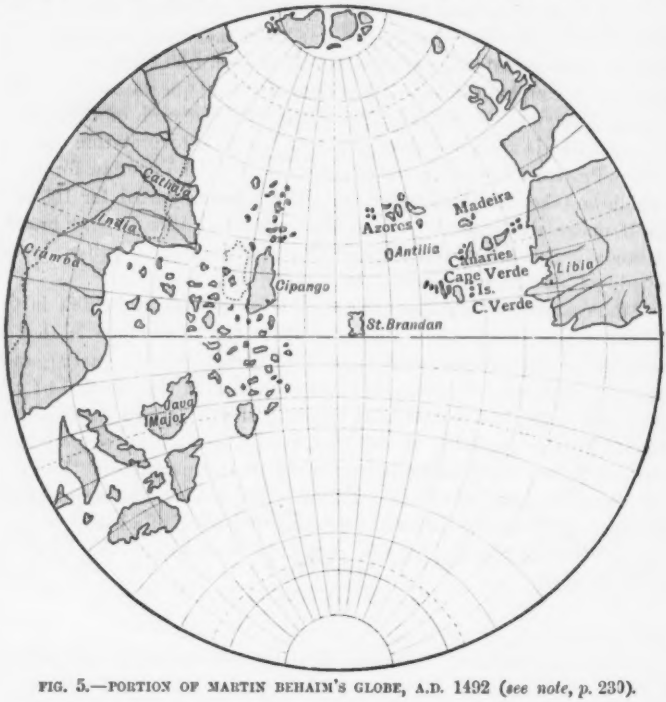

FIG. 5.—PORTION OF MARTIN BEHAIM'S GLOBE, A.D. 1492 (*see note, p.* 230).

easily accessible by its republication in the admirable series of volumes issued by the Hakluyt Society—a reference to a voyage which agrees excellently well.

"In this yeare also, 1447," says Galvão, "it happened that there came a Portugall ship through the streight of Gibraltar, and being taken with a great tempest, was forced to runne westwards more than

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from Cape Verde to the nearest point of Brazil is 1610 nautical miles of 60 to a degree. Reduced to the scale of 56⅔ miles to a degree, this becomes 1520 miles!

Too much stress ought not to be laid on this coincidence, as a round number like 1500 may have been used simply to express great distance. Marco Polo uses it frequently; as, for instance, Chipangu 1500 miles from the continent, Chamba 1500 miles from Zayton, Java 1500 miles from Chamba.

willingly the men would, and at last they came to an Island. . . . The boateswaine of the ship brought home a little of the sand, and sold it unto a goldsmith of Lisbon, out of the which he had a good quantitie of gold." *

Galvão goes on to state that he is inclined to believe that the island thus found was Nova Spagna—that is, in the West Indies. This may be so, but when it is remembered that at that period Portuguese effort was concentrated on the Cape Verde region of West Africa, it seems equally probable that the "Island" was Brazil, and that Bianco's map, made in the following year, records the fact.

It may be a source of wonder that Andrea Bianco, a Venetian, was able to obtain the important information that his map discloses. The experience of his fellow-citizen Cadamosto, however, furnishes a clue.

This distinguished discoverer fortunately left behind him a written record of his travels.† From them we learn that he left his native city in 1454, intending to sail as far as Flanders with the Venetian fleet annually despatched to that country and England. On reaching Portugal, however, he was persuaded by Prince Henry to enter his service, by the handsomest promises, afterwards fully redeemed, for the prince was especially anxious to obtain the help of Venetians.

Doubtless Andrea Bianco, "comito de galia," ‡ as he signs himself on his map, sailed with the similar Flanders fleet six years earlier, in 1448, and, either by the courtesy of Prince Henry himself or in some other way, obtained his information when calling on the voyage at Portugal. He may even have met there the captain of the vessel, which discovered an unknown island in 1447. Anyhow, his information must have seemed of great importance, for he committed it to parchment, in the form of the map to which I have referred, in *London*, without waiting for his return home.

* From Hakluyt's translation, edited by Vice-Admiral Bethune for the Hakluyt Society, 1862. The words omitted are, "which had seven cities, and the people spake the Portugall toong, and they demanded if the Moores did yet trouble Spain, whence they had fled for the losse which they received by the death of the King of Spaine, Don Roderigo." This passage, making the inhabitants a set of 700-year-old Rip van Winkles, is evidently a mere sailor's yarn, associating the Island with the unknown land to which the seven bishops had fled in the eighth century, according to the tradition already mentioned. The essential facts are the discovery of an island, and the finding of gold

The same story is told in the 'Life of Columbus,' ascribed to his son, and generally cited as the 'Historie.' In this case the gold-bearing sand is picked up by the cabin-boys, while the crew are at church. The 'Historie' adds that several expeditions were sent out from Portugal to rediscover the island, and details are given of one which sailed forty years before Columbus' first voyage; that would be in 1452.

† First published in 'Pœsi novamente retrovati' (Vicenza, 1507). Cf. H. Y. Oldham, 'The Discovery of the Cape Verde Islands,' in 'Festschrift Ferdinand Freiherrn von Richthofen.' Berlin, 1893.

‡ Comito = boatswain (Baretti); quel l'Ufiziale che commanda alla ciurma delle galee, e ch' è dipendente dal sopracomito (Contarini).

The full importance of this fact will be best appreciated by those who have studied, in the Venetian State Papers, the conditions under which the intercourse between Venice and London was maintained at that time, and remember the excessive penalties to which a captain laid himself open if he dared to remain for longer than a very limited period in our capital.*

One might at first sight expect to find indications of Bianco's "Genuine Island" on other maps of the period, but a little consideration shows this to be improbable. The exceptional nature of Bianco's 1448 map has been mentioned. On the ordinary portolani, dealing with the Mediterranean, there is no place for such an island; even the rare ones that show the West African coast beyond Cape Bojador have no room for it. Similarly on Fra Mauro's great map of the world, where it might be expected to be found, the edge of the map is drawn so close to the coast of Africa that there is not even room for the Cape Verde Islands, much less for one 1500 miles to the west.

It is, indeed, not till maps dealing with the Atlantic Ocean were made, that an indication of it could really be anticipated.

The first of these we possess is the famous globe of Martin Behaim, made in 1492.† Here the island ought to be, and here it is to be found, as a large island in about the same latitude south of Cape Verde as that in which it is shown on Bianco's map, but moved naturally much further to the west. That it should bear the name St. Brandan is not to be wondered at. The name of the old Irish saint is to be found at different periods attached to most of the great groups of the Atlantic islands, always apparently getting moved on as a group became well known, to one more recently brought to light. On Bianco's 1448 map, for instance, it is to be found attached to the new series of Azores, there shown for the first time; but between 1448 and 1492 the Azores had become better known and properly named, and accordingly on Behaim's globe "St. Brandan" is moved once more, for the last time, however, to find a resting-place on Bianco's "Genuine," but hitherto "unnamed" island.‡

* The galleys were only allowed to remain in London for 90 days, with 15 for clearing the custom-house. The penalties included a fine of 1000 golden ducats to each master, with privation of office for ten years. Cf. Rawdon Brown, 'Calendar of State Papers' (Venetian), vol. i., 1864.

† The sketch of Behaim's globe used to illustrate this article is adapted from the drawing in Ruge's 'Zeitalter der Entdeckungen,' the best available. Professor H. Wagner has just issued an interesting pamphlet (reprint from *Nachrichten der k. Gesellschaft der Wissenschaften zu Göttingen*, 1894, No. 3) on the various reproductions of Behaim's globe, with a new reconstruction of Toscanelli's map. The true outline and position of the coasts of Asia and Japan on Behaim's globe, according to Prof. Wagner, are indicated by dotted lines in Fig. 5.

‡ St. Brandan's Island is often spoken of as one which was shifted about on mediæval maps from place to place. This is not the case really. It is quite exceptional to find

Why, it may be justly urged, did not the Portuguese make use of such important information, if they had really discovered South America before 1448?

To this one might answer in the manner of the law courts: (1) They were wise in not doing so. (2) They did.

For, *first*, they were right in neglecting everything which tended to divert their efforts to find a route round Africa to the East, especially as Prince Henry had by Papal Bulls obtained rights over all discoveries that he might make from Capes Nun and Bojador, along the African coast, "even to the Indies."

It was doubtless for this reason, as well as from a just confidence that the shortest route to the Indies was really the road round Africa, which for more than half a century they had been seeking, that the Portuguese declined to adopt the western route proposed to them by Toscanelli, even when subsequently urged with all the eloquence of Columbus.

Secondly, that they had not forgotten the discovery seems to be shown in their action, which led to the well-known Tordesillas Treaty. It will be remembered that, on the return of Columbus from his first voyage, the Spaniards sent with almost incredible speed to Rome to demand rights of possession over the new-found land. This was granted on May 3, 1493; but, in order to avoid collisions between Portugal and Spain, on the following day, May 4, a fresh bull was promulgated defining the famous line of demarcation. This line was to be drawn 100 leagues west and south of the Azores, or Cape Verde Islands, and, while the Portuguese retained their previous rights of discovery to the east of the line, similar rights were granted to the Spaniards to the west of it.*

Far from producing peace, however, this line of demarcation aroused a storm of protest from the Portuguese, which was so vigorous and successful that in the following year the Spaniards were glad to agree to the Tordesillas Treaty, whereby the line was shifted 270 leagues further to the west.

What arguments the Portuguese used to obtain this concession, and, still more, what private reasons they had for risking a quarrel with their neighbours to gain it, have never yet been made clear. If, however, as the evidence here adduced tends to show, they had information with regard to Brazil, their reasons become manifest.

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any definite island of St. Brandan. The usual custom in the fifteenth century was to insert an inscription, "Insule fortunate sancti brandani," near the Canaries, Madeiras, or Azores, generally between the two latter. On Behaim's globe the island is not named "St. Brandan," but has beside it a legend beginning "nach christi gepurt 565 jar kam sand brandan mit sein Schiff auf dise Insel." See Kretschmer, 'Entdeckung Amerika's,' kap. iii., for references to the St. Brandan legend.

* The history of the demarcation-line is ably discussed in an article by Prof. E. G. Bourne in the *Yale Review*, vol. i., May, 1892.

Moreover, only on some such hypothesis can be explained the extraordinary proposal made in the course of the negotiations by the King of Portugal, as recorded by Herrera, the official Spanish historiographer of the Indies. "Let the line of demarcation run," the Portuguese sovereign seems to have said, "not from north to south, *but from east to west* in the latitude of the Canaries, the Spaniards to have all new land that they find to the north, the Portuguese all to the *south*, of this line." *

Fortunately for themselves, the Spaniards refused to consider this ingenious proposal, which would ultimately have given to Portugal the whole of South America, but agreed to a shifting of the line so far to the west that the Portuguese obtained that portion which we now know as Brazil.†

Finally, it may be asked, How was it that Columbus, who assiduously collected information with regard to Western lands, did not know of this? The answer is simple and short—He probably did.

Every one who has studied the life of Columbus must have remarked the peculiar course adopted in his third voyage in 1498, when he sailed down to the C. Verde Islands and still further south, before turning to the west. The reasons usually given for this course seem so inadequate, that it is strange that the one given by Herrera should have been generally overlooked, and yet it is as precise and reasonable as could be wished. "He resolved," says Herrera, "*to sail to the southward to find out whether King John of Portugal had been mistaken, who affirmed that there was a continent to the southward.*" ‡

To sum up briefly. The shortest route from the Old World to the New is from Cape Verde to Brazil. Winds and currents tend to carry a ship across. There is, therefore, an inherent probability that a Portuguese vessel should have been driven on to the Brazilian coast. This actually happened to Cabral in 1500. It might have happened at any time after ships began to round Cape Verde. That Cape was first rounded in 1445. In 1448 a remarkable map was made by Bianco, showing the most recent Portuguese discoveries. On it a long stretch of coast-line is shown south-west from Cape Verde, with an inscription saying that it is authentic, and 1500 miles to the west. The only land in such a position is South America. The discovery must have been

* Herrera, 'Historia General de los Hechos de los Castellanos,' 1601, Decad. i. lib. ii. cap. viii.

† It is noteworthy that the Tordesillas treaty distinctly anticipated the possibility of the line, as agreed on, passing through land, in which case a tower was to be erected to mark it. Humboldt refers to this in 'Cosmos.'

‡ Herrera, Decad. i. lib. iii. cap. ix. "Y determinado tambien de navegar al Sur, por entender si se enganaba el Rei D. Juan de Portugal, que afirmaba que al Sur havia Tierra-firme." The quotation in text is from Stevens' translation. London, 1725.

made between 1445 and 1448. It is recorded that an unknown island was found far to the west in 1447. On the first map dealing with the Atlantic Ocean after Bianco's map, a large island is found in the position indicated by Bianco. The Portuguese had good reason for not troubling much about such an island, until the Papal Bull of 1493 with its line of demarcation, when their conduct leading to the Tordesillas Treaty of 1494, by which the line was shifted so far that they secured Brazil, seems to have been based on knowledge of the existence of land in the position of that country. Moreover, there is evidence to show that they publicly claimed the possession of such knowledge.

If the views here set forth are tenable, the interesting and important result is obtained, that America was discovered by the Portuguese in or about the very year in which Columbus is believed to have been born.

Without removing one iota from the real merit of Columbus, it would add the crowning laurel to the already great glory of that marvellous man, Prince Henry the Navigator, who, it is pardonable to remember, was half an Englishman.

Before the reading of the paper, the PRESIDENT made the following remarks: In commencing this new departure it will be necessary that I should give the reason and objects for doing so. It is now exactly forty years ago since the last time that I addressed the Fellows of this Society in their own room, and I do not think any one has ever addressed them in their own room since; so that, so far as I am concerned, I begin just where I left off. We have thought it desirable that there should be occasional afternoon meetings in the map-room, in order more fully to consider and discuss technical and scientific questions which are not so well suited for large popular assemblies. I feel that several branches of our science have hitherto not received due attention, and I trust that by this new departure that want will come to an end. The subjects I refer to are such as that to which we are going to listen this afternoon—touching on historical and comparative geography, on all matters relating to projections and cartography, the production of maps, inventions connected with the scientific and surveying instruments for the use of travellers, suggestions with reference to the more graphic illustration of various problems and of matters that are of interest to travellers by diagrams or otherwise; also subjects relating to questions of spelling and geographical nomenclature; and, in short, all such subjects as require careful and critical consideration and discussion at the hands of experts. I think we are fortunate this evening in commencing the study of the history of our science by considering one of the very early maps of the fifteenth century. Mr. Yule Oldham will be kind enough to explain to us some peculiarities in one of the early maps of Andrea Bianco, will tell us how he deduces from these peculiarities his own conclusions that America was discovered at a much earlier date than is generally supposed to be the case, and he will also show us reasons for his conclusions. I am sure that the paper will be well received, for the pupil of von Richthofen and the god-son of my old friend Sir Henry Yule, who was so long at the head of this branch of geographical inquiry, is entitled to receive from the Fellows of this Society a cordial reception whenever he is good enough to address us. I now call upon Mr. Yule Oldham to read his paper.

After the reading of the paper, the following discussion took place:—

Mr. E. G. RAVENSTEIN said that the author of the paper just read had placed the

subject before them in an admirable and lucid manner, and he therefore regretted all the more that he could not agree with him as to the supposed pre-Columban discovery of America. "Longa a ponente 1500 mill" in the legend on Bianco's map surely meant "extends 1500 miles to the west," and if this was so, all idea of Brazil must be excluded. Nor could he look upon this fanciful island of almost continental extension as recording an early and unrecorded discovery of the Cape Verde islands. Azurara's Chronicle, he thought, presented them with a full statement of all the Portuguese expeditions which had been fitted out up to 1448, and not a hint was to be found there as to any tremendous discovery such as that shadowed forth in Bianco's map. Reference had also been made to Behaim. He thought that cosmographer a much over-rated man, who became famous without having done anything to deserve fame. His globe was made at the suggestion of the Nüremberg town council, and Behaim, as well as the artists who actually did the work, was well paid for it. As a geographical document that globe possessed very little value. Not only had Behaim filled the Atlantic with fabulous islands; he had also given a monstrously incorrect delineation of the coast of Western Africa, which he claimed to have explored in company of Diogo Cão. Any Portuguese pilot, furnished with an astrolabe and the ephemerides of Abraham Zacut, could have determined the latitudes more accurately than appeared to have been done by Behaim, who claimed to be a disciple of the famous Regiomontanus. On this globe the Cape Verde islands were shown hundreds of miles out of their true position, whilst Antilia, or the Island of the Seven Cities, was a mere myth. Galvão stated that in 1447 a ship, driven to the westward by a storm, discovered this Island of the Seven Cities. On the face of it, this record of the usually very sober Galvão was fabulous, for the inhabitants of the island are stated to have asked whether the Moors still occupied Spain, from which they had fled more than seven hundred years ago, after the battle of Xeres de la Frontara. No island in any way corresponding to that referred to had ever been discovered. As to Cabral's discovery of Brazil, it certainly was not due to any knowledge which the Portuguese might have possessed of the existence of land in that direction; it was the necessary sequence of the sailing instructions with which he had been furnished. These instructions were a confidential document, and any knowledge in possession of the crown, and likely to be of use to the navigator, would have found its way into them. The Portuguese were certainly not a people who put their lights under a bushel; had they been able to produce even a shred of evidence in favour of the contention that they discovered America before Columbus, they would long since have done so, and they would have pointed out that only the mistaken policy of secrecy, which governs even now a good many government departments, had deprived them of the credit which otherwise they would have won among the peoples of the world.

Mr. E. J. Payne, while fully recognizing the value of Mr. Oldham's paper, felt compelled to dissent from his conclusion. What did Bianco's map prove? Not that any one had discovered South America, but simply that the map-maker believed in an island in that part of the ocean, an island designated on the map "Otinticha;" and this name was probably a misreading for "Antilia."

Mr. Oldham interposed with the remark that he would value very much any remarks that Mr. Payne might make, but he begged him not to pursue that line of argument, inasmuch as Bianco's map of 1436 showed Antilia in its usua. position to the west of Portugal. It was hardly likely that the same man would so strangely contradict himself as to place the island of Antilia in a totally different place some twelve years later.

Mr. Payne replied that this was precisely what the progress of discovery compelled Bianco to do. Since 1436 the Azores had been discovered, and found to

occupy the very part of the ocean in which older maps had placed Antilia. This island, therefore, had to be moved further south; "Brasil" and St. Brandan's were similarly moved southward as the exploration of the northern Atlantic proceeded. If "Otinticha" did not represent Antilia, this latter island, which was still universally believed in, disappeared from Bianco's map altogether—a very unlikely thing to happen. Bianco obtained his information in Portugal, on his way from Venice to England. He must there have seen the new discoveries drawn on a Portuguese map; and on such a map "Antilia" would be written "Antilha." Five out of the seven letters in "Antilha" were found in "Otinticha" (the "nti" in the middle and the "ha" at the end). The cursive capital "A" often began with a small flourish, which might easily be misread as "O"; and if the cross-line of the "A" were terminated to the right by a short vertical dash, this letter might easily be mistaken by a foreigner for "oti." It was only necessary to suppose the "l" in "Antilha" to have been a trifle shorter than usual to make "Otinticha" a very probable misreading of "Antilha." After criticizing Mr. Oldham's reference to Galvano, and his contention that "Otinticha" had been omitted from subsequent maps because room could not be made for it, Mr. Payne remarked on the similarity of outline presented by Bianco's "Otinticha" and the "Antilia" of contemporary map-makers. In laying down imaginary islands, cartographers might be allowed some licence; if they moved them about in the ocean, they might well be allowed to turn them round. In conclusion, he again alluded to the industry and ingenuity displayed by Mr. Oldham in his endeavour to throw new light on the somewhat stale but ever-fascinating question of the first discovery of America, and added that he should join most cordially in the vote of thanks which would no doubt be accorded to him for his interesting lecture.

Commander HULL said he had been much struck with Mr. Yule Oldham's theory of the Portuguese discovery of South America by having been blown upon that coast. He happened to have sailed in a ship that may be said to have discovered America by accident. H.M.S. *Herald*, in 1845, when bound to the Pacific, meeting with south and south-east winds after clearing the Doldrums, stood resolutely to the westward instead of tacking to the eastward, crossing the line in 30° W., and so was forced to sight first Fernando de Noronha, and then the coast northward of Pernambuco; making, nevertheless, a good passage to Rio. The island shown on the last map would fairly represent Fernando de Noronha. He thought the Portuguese story a very probable one.

Mr. MORGAN congratulated the Society on having their new series of meetings inaugurated by so interesting a subject as that now brought before them. He considered Mr. Oldham's arguments in support of his theory very convincing, though, of course, in introducing such a new idea as a pre-Columban discovery of America, he had to contend against the old and rooted opinions that had prevailed so long. As far as it was possible to judge from the photograph of Bianco's map, the coast line in the south-west corner with its inscription could only refer to Brazil. Other readings had been suggested, but these all rest on a supposed omission of words or parts of words in the original. Mr. Oldham's interpretation seemed to him (the speaker) the right one, if the word "longa" had the same meaning as "lontana." Sailing ships of the fifteenth century were almost at the mercy of the winds, and it was highly probable that the Portuguese, in sailing down the west coast of Africa, were blown across the Atlantic.

Mr. RAYMOND BEAZLEY disagreed with Mr. Oldham. He had just been examining the photographs of the map in question in the British Museum, and Mr. Coote agreed with him in the belief that the "Genuine Island" referred either to one

newly discovered to the south-west of Cape Verde, or else was an allusion to such a mythical country as Antilia. The contention that it was Fernando Noronha, or even Ascension, was more probable than that it was part of the continent. Mr. Oldham surely would not maintain that the islands of Antilia or the Seven Cities existed in reality. His contention about the fleets of the Portuguese constantly getting astray was against the evidence. He had spoken of ten or twelve ships sailing together down the African coast in Prince Henry's time, but, as a matter of fact, fully twenty-eight vessels sailed in (*e.g.*) 1445 from Lagos, but the track of every one of these was accounted for, and its return to Portugal stated. The *possibility* of such a voyage as Cabral's occurring earlier was a strong point, but his own discovery was surely accidental. Cabral was simply directed to look for new lands *en route* for India, and there was no certain knowledge of a continent in that part of the world to guide him. He stood out to escape the currents of the Guinea Coast, and so found South America. Mr. Oldham's explanation of the inscription was not convincing, and they could not fairly infer that his reading was correct. The conventional islands which were put north and south, with their points facing one another, were like the Brazil Islands, to be found in so many maps. This autumn the speaker had looked through the Portolani of the Bodleian Library, and on four of them he found these conventional islands, but he believed this "Isola otinticha" of Andrea Bianco's, south of the conventional islands, had no more claim to be regarded as proof of a discovery of America than an inscription on one of those Oxford maps, "Isola d'Isepanyola," slightly to the south of the conventional Brazil, west of Ireland. The line of the coast of Mr. Oldham's island also seemed to be in a contrary direction to that required by reality. Lastly, the scale of the map was very large, and yet the distance between Africa and the new land was extremely small—it was not much more than between Gomera and the continent—and that could hardly be explained away. The arguments about the want of space seemed to be inconclusive, because, if a discovery so important had been made, mere want of space would not have been allowed to rule it out of all maps between 1445 and 1492.

Dr. H. SCHLICHTER: Mr. Oldham's interesting paper opens a large field for discussion. Mr. Oldham correctly mentioned that on the first map dealing with the Atlantic Ocean, after Bianco's map—namely, Behaim's globe of 1492—there is a large island shown in the position indicated by Bianco. This island is described as the island of St. Brandan, who is supposed to have reached it with his ship, according to Behaim, as early as in the year 565. This statement leads us at once to the old and often-repeated story of the fourteenth and fifteenth centuries on the islands of Saint Brandan and Antilia, about the existence of which many Portuguese and Italian navigators and cartographers of that age seem to have had no doubt whatever. Already the map of Pizigano (1367) contains the island of San Brandany; and another very interesting map of the year 1425 has the islands of Saint Brandan and Antilia. Alexander von Humboldt, who has described this last-named map, is of opinion that it is of Italian origin. A third map of great importance is the first map of Bianco from the year 1436 (which has already been mentioned this evening), and besides that Humboldt describes a planisphere of Bianco, which, according to some authors, contains indications that it is partly copied from a fourteenth-century map containing information even older than Marco Polo. On both these maps of Bianco—which have been drawn prior to the one in question—there is represented a large island called Antilia, carefully drawn, so that Humboldt correctly remarks, that the outlines of the coast are drawn so distinctly that one might suppose the island had been actually surveyed. This same island we find again on Martin Behaim's globe, with the only difference that it

is called there St. Brandan, whilst Antilia on this globe is a smaller island more to the north.

Now, if we compare all these maps with the map in question, viz. the Bianco map of 1448, we can have, I believe, no reasonable doubt that the island which Bianco puts down west of Cape Verde, and which is described in that peculiar way mentioned by Mr. Oldham, is one of the two hypothetical islands which are described by the cartographers somewhat indistinctly either as Antilia or the island of Saint Brandan. Although none of all the maps mentioned seem to show any doubt about the existence of one or both of these islands, yet their positions are constantly shifted about without any critical considerations. It is, however, evident, from a comparison of the above-mentioned maps, that these islands, in which everybody believed, but which nobody had seen, were placed more and more southward and westward in strict proportion with the progress of the Portuguese discoveries. Thus on the map of 1425 the island of Antilia lies within 5° to the west of Cape Bojador; whilst, as we have seen, on the maps of Bianco and Behaim it is far more distant from Europe and Africa.

I have not mentioned the Benincasa maps, the dates of which fall between Bianco and Behaim; these also contain the island of *Antilia*, but as it is somewhat doubtful whether it is not a later addition of the sixteenth century, I consider it best not to rely upon this evidence. But as regards Martin Behaim, it is evident, from the shape and position of his island of Saint Brandan, that he has used the maps of Bianco—or such from which Bianco copied, if he did—taking the shape from the 1436 map, and the position from the 1448 map. Thus we find Martin Behaim's large island lying close to the equator, and in the middle between Japan and Africa.

All this leaves no doubt to my mind that no such island was really discovered, but existed only in the imagination of navigators and cartographers of the fifteenth century. Nor is the origin of the mystery far to seek; for a complete story about a very old Portuguese colony in the middle of the Atlantic is given in detail by Martin Behaim. Alexander von Humboldt correctly remarks that such stories were readily believed in those times, and became so deeply rooted that nobody disputed them seriously. This hypothetical Atlantic colony was known as the colony of the *Seven Cities*, and these were supposed to be situated on this very island of Antilia, as is proved by the independent evidence of Martin Behaim, and of Toscanelli, in one of his letters to Martinez, in which the following passage occurs: "The island of Antilia, which you call that of the seven cities. . . ." This, I think, is the light in which we have to regard the statement made by Galvano to which Mr. Oldham has referred. For in the same passage, immediately after the lines cited by Mr. Oldham, the Portuguese language, the Moors, and Spain are mentioned.

But there is, moreover, also strong direct evidence in favour of Columbus, viz. the report of the great Portuguese writer, De Barros, about the reception of Columbus at the Portuguese court, when he returned from his wonderful journey. The graphic description of the anger and annoyance of the Portuguese at the quite unexpected success of their rivals, and their envy and rage against the somewhat arrogant discoverer—which only by the personal intervention of the king did not take a dangerous turn for the latter—all this proves plainly enough, that if they had had any claim respecting a previous discovery of the New World, they would not have omitted to emphasize it. We can, further, plainly see from De Barros that also later on, when the subject of Columbus's discoveries was fully discussed between Spain and Portugal, the Portuguese were unable to produce any evidence of a pre-Columban discovery of America.

Mr. A. S. Bicknell asked why Mr. Oldham thought the island on his map was the continent of Brazil, when the position corresponded with that of Trinidad, and no discoverer would plot a coast as a square island. If the course from Cape Verde, however, was south-west, Fernando Noronha would be struck, and the 1500 miles marked might simply be an explorer's exaggeration, or indicate the length of his ocean voyage.

Mr. Oldham, in reply, said: The island on Bianco's map cannot reasonably be expected to represent a survey of a coast; while believing it to indicate Brazil I do not attempt to identify it with any particular part of that country. One of the cardinal rules of translation is to take the meaning that makes the best sense. It is, therefore, natural to adopt the meaning "genuine island, distant to the west 1500 miles," rather than "is 1500 miles long to the west," which in comparison is meaningless and pointless, quite apart from the extreme improbability of 1500 miles of coast-line having been explored in a single voyage. I cannot attempt to answer Mr. Ravenstein's denunciation of Behaim, as it does not affect the main question; but to say, as more than one has done, that the discovery of South America in the way I have maintained would have been a "tremendous" affair, seems to show a complete misunderstanding of the state of knowledge in the middle of the fifteenth century. No one at that time would have realised what such a discovery meant. It would have been simply one more island in the western seas. No one expected to find a continent. There was no suspicion of there being a continent to find, and the small part explored would naturally seem only a portion of an island. To Prince Henry such a discovery was probably not one to be received with enthusiasm, but rather to be put aside as likely to distract attention from the prosecution of his more profitable and ambitious projects along the African coast. My own studies in mediæval cartography prevent my accepting the views expressed by Mr. Payne and Dr. Schlichter with regard to the shifting of islands, and the former's suggestion that "Otinticha" is a misreading of "Antilia" seems so unlikely and unnecessary, that I must leave it to the sense of the meeting. Both before and after Bianco the position and form of Antilia was practically constant, and neither in size, shape, nor situation does the "Otinticha" island resemble it. Mr. Beazley's contention that Ascension was more likely to have been discovered than South America, can only be based on a complete misconception of the prevalent winds and currents in the Atlantic, which Commander Hull's practical experience should help to remove. I was well aware that more ships sailed from Portugal in one year than I spoke of, and trust that my smaller figures may be taken as an example of the spirit of moderation in which I have tried to express my views! I cannot, however, accept the statement that the track of every vessel was known. While thanking Mr. Morgan for his support, I cannot help regretting that many of the main points of my argument have not been touched upon in this discussion. I did not expect to convince all my hearers, because every one naturally approaches a question of this kind unconsciously prejudiced by his original views; but I feel confident that the more it is examined the more will the line of arguments adopted be found to be a sound one, the investigation of which will lead to new discoveries tending to establish its truth. Anyhow, it has been a particular pleasure to me to bring it before the Society this afternoon.

The President said that the admirable paper which they had heard at all events showed how very interesting the study of the Portolani was. These islands and rocks scattered about on their maps of the Atlantic Ocean by the old cartographers led to most fascinating speculations, and to further investigations into the by-paths of history and geography, all of which tended very much to increase our

knowledge. He thought that Mr. Oldham had marshalled his arguments with great skill, and they also had to thank him for the extremely interesting photographs that he had provided for them. As President, he should claim the right to reserve his opinion, for the present, on the particular point that had been discussed that evening, even if the time admitted of his continuing the discussion; but he wished that hereafter Mr. Yule Oldham, or some other student, would give them a history of these Portolani of the fourteenth and fifteenth centuries, and tell them all that was known about the authors, the kind of information they collected, and the system upon which they drew their maps, and also trace out the history of these islands which they scattered over their maps of the Atlantic, and the positions of which were so often shifted. He desired to propose a most cordial vote of thanks to Mr. Oldham, for the extremely interesting and valuable paper presented to them, which he hoped would lead to further investigation.

NOTE ON MR. YULE OLDHAM'S THEORY OF THE DISCOVERY OF AMERICA IN 1447.

By the PRESIDENT.

Mr. Yule Oldham has called our attention to a curious marginal note on the old map drawn by Andrea Bianco in London in 1448. It is at the foot and quite at the edge, and consists of a coast-line and a legend of two lines. The map has been cut close to the letters, and there may well have been another line. What remains is very illegible. It has been interpreted by experts as follows: "*Authentic Island is distant to the west* 1500 *miles.*" Mr. Yule Oldham believes that this means that a Portuguese vessel had sailed from the Cape Verde islands to Brazil, by a south-south-west course, and discovered America at some time before 1448. Galvano (1555) mentions the tradition of a vessel having been blown to the westward in about 1447, so Mr. Yule Oldham takes this as the date of the supposed voyage.

Mr. Yule Oldham has marshalled his materials and drawn up his argument with great ability. I regret very much that I am unable to follow him, though I am quite open to conviction. I am not at present quite convinced that the marginal note may not have been written by another and a much later hand, nor that the legend is correctly deciphered. But, assuming this to be the case, I am still encountered by difficulties which appear to me to be insurmountable.

I hold it to be extremely improbable that a Portuguese vessel can have crossed the Atlantic in 1447. She would not have done so intentionally, and if she had been blown off the shore by a gale, she would have used every effort to return as soon as the wind abated.

The legend, as interpreted, gives the course as west. Mr. Yule Oldham's suggestion, that the vessel's course was south-south-west to the coast of Brazil, therefore seems to me to be inadmissible. On a west

course from the Cape Verdes, a distance of 1500 miles, which is sure to have been exaggerated, would not have taken her anywhere near America; and a west course, at least within two or three points either way, is a necessity, if any argument is to be based on the legend as deciphered by experts. I am afraid, therefore, that the theory of a discovery of America in 1447 cannot be admitted.

No departure is given on the legend. I cannot suppose that no departure was originally given, for the legend is unmeaning without one; and this increases the probability that a line has been cut off. To suppose that the departure was from the Cape Verde Isles, or any other point, without any authority, is a purely arbitrary assumption. But if, as Mr. Yule Oldham believes, Galvano alludes to the same voyage, he does give the departure. It is from the Strait of Gibraltar, course westerly, and the distance "much farther than they wished." A westerly course (N. 80° W.) and a distance of about 1200 miles (which would be quite 1500 by such a dead reckoning as would have been kept in 1447) would have brought a vessel to one of the Azores. The legend on Bianco's map, by the light shown by Galvano, is thus explained. A vessel was blown out of the Strait of Gibraltar in 1447 westerly, for a distance reckoned at 1500 miles, and the "authentic island" was one of the Azores. The Azores are shown on the Laurentian map of 1351, and had been copied into others, including one by Bianco himself, dated 1436. But they had not been visited for nearly a century, and had to be re-discovered before their authenticity could be established. St. Mary had been re-discovered in 1432, and St. Michael in 1444. The re-discovery of another of the Azores further west, perhaps Flores, in 1447, would establish the authenticity of the other western islands on Bianco's map of 1436, and naturally led him to refer to it as an "authentic island;" of the visit to which he may have just heard at Lisbon after his map was completed, on his return voyage from London. This, I am inclined to think, may account for the curious marginal note on the map of 1448; assuming that it is in Bianco's hand, and has been correctly deciphered. Galvano's seven cities, and inquiries after the Moors, are the natural accretions which the story of this voyage to Flores had received in the course of another century.

A TRIP TO TURKISTAN.

By Captain H. BOWER.

Towards the end of 1888 I happened to hear that my friend Major Cumberland was contemplating a visit to the Pamirs in search of *Ovis Poli*, and was anxious to find a companion; so I determined, if matters could be arranged and leave obtained, to accompany him. Shortly

afterwards he came to Ferozepore, where I was quartered at the time, and we were able to talk over things together. Then he started for Kashmir, and I put in an application for a year's furlough. This was granted, and on June 14, 1889, I left Ferozepore by rail for Rawul Pindi; thence I pushed on as fast as possible to Srinagar, the capital of Kashmir, which was reached on the evening of the 17th. But I need not have hurried, as the first news I heard on arrival was that it was of no use going on, as the rivers in Raskam, a country we had intended to traverse, were sure to be in flood owing to the melting snows. As neither of us cared much for Srinagar, we determined to push on to Leh, and do whatever waiting had to be done there; so we left Kashmir on the 22nd, and reached Leh on July 7. At Leh we met M. Dauvergne, whose intention was to make the same trip as ourselves, and who was taking up a small tablet to place on the spot where Mr. Dalgleish had been murdered the previous year. Our original intention had been to leave the Leh-Yarkand road at Aktagh, and then turn west by Raskam and Sarikol to the Taghdumbash; but before leaving Leh we were informed by Captain Ramsay, British Joint Commissioner, that we could not be allowed to proceed unless we signed a paper promising not to go through Raskam, as it was considered unsafe owing to the marauding bands of Kunjuts. These Kunjuts have for many years been a pest to all law-abiding, peaceful people in their neighbourhood. From their country of Hunza they would issue forth, and, taking advantage of the night—for they never attacked by day—fall on some unsuspecting camp of Kirghiz or traders, and, having plundered everything they could lay their hands on, carry the unfortunate people off to slavery. So much was their very name hated, that I have heard a man describe a wind as a Kunjuti wind when he wished to describe what we would call a bitter, cruel wind; to his mind that word "Kunjuti" summed it all up. They were not a brave people; night surprises and ambushes were what they excelled in. Secure in their mountain fastnesses, they judged themselves invincible, until Colonel Durand's brilliant little campaign awoke them from their fools' paradise, putting a stop for ever to their raids, and now the Raskam route to the Taghdumbash is as safe as any other. It was a matter of very considerable inconvenience to us not being allowed to go that road as we had intended. The only other route we knew of to the Taghdumbash was round by Yarkand, which would have taken twice as long. However, our caravanbashi, on being consulted, said that he had once heard that from some place on the north side of the Killian pass a road ran east, which would most likely take us there.

Having got together a caravan of fifteen ponies between Major Cumberland and myself—M. Dauvergne having his own separate—we left Leh on July 27, and, crossing the Khardung pass, where our things had to be carried on yaks, descended into the Nubra valley.

From Charlung, at the head of the Nubra valley, to Shahidulla there is a very bad stretch of country which takes about eight days to cross, and contains three passes—the Karakorum, 18,550 feet; the Sasser, 17,800 feet; and the Suget. Struggling over stones and through snow at these altitudes with heavy loads tells terribly on horseflesh; the whole way is strewn with the bones of traders' ponies that have died on the road. On the Dipsang plains the long line of white bones stretches across like a ribbon, and no one could miss the road.

On the Karakorum we built a pyramid of stones, and on it placed the tablet in memory of Mr. Dalgleish that M. Dauvergne had brought. At Shahidulla, where there is a small encampment of Kirghiz, the grazing is good, so we halted there for a few days to give the ponies a much-required rest. Furdikul, the chief or akskal (literally, "white beard"), paid us a visit, and we entertained him with tea, biscuits, nuts, etc. Amongst the Turkis, before sitting down to any repast, a great deal of stroking of beards goes on; then the formula "Allah o Akhbar" is repeated, and every one kneels down on both knees, sitting back on their heels, a most uncomfortable and constrained position. The host usually requests his guests to sit at their ease; they then sit cross-legged. At the conclusion of the repast all beards are again stroked, and "Allah o Akhbar" is again repeated.

After leaving Shahidulla we marched down the valley of the Karakash river, which had to be forded twice, while the Tograsu, a tributary, had to be forded once. The latter, though holding much less water than the Karakash, is the most difficult to cross owing to the stony nature of the bottom; ponies often stumble, and once down they never can rise again, but are invariably drowned. We were fortunate in getting over without any loss, and, turning up a side valley, commenced the ascent of the Killian pass. Near the top it was covered with snow, sufficiently deep and soft to give the ponies a great deal of trouble in getting over. This pass is nearly always rather difficult to cross, and, though not as bad as the Sasser or Kulti i Kandhar, it is bad enough to make it advisable to have all the ponies' loads put on to yaks. On the north side great numbers of Ram chickore, or Himalayan snow cock, were to be seen running about, and half a dozen shot without the least trouble came in handy for the pot. On this side the soil is of quite a different character to that on the southern side; the disintegrated rock that forms the barren soil of Ladakh is replaced by fine yellow soil, and away to the north the dust blown up from the desert could be seen hanging over the plains of Turkistan. At the place where we camped after descending from the pass, a shepherd resided who owned a fine golden eagle. These eagles are much used for hunting gazelle, foxes, and hares in the flat country through which the Kashgar and Yarkand rivers flow. It is capital sport, and during the time I was in that country I was fortunate in seeing some of it. The

eagle, on being released, does not go off nearly as quickly as a hawk, but takes some little time overtaking the quarry; and in the mean while, if the quarry is a gazelle, the hunters must ride as hard as their horses can go, as the eagle, on overtaking it, simply settles on its quarters and turns it over. If no one is up to come to the eagle's assistance, the gazelle gets free, while the eagle sits still on the ground, refusing to rise.

Leaving Khusghum, the camp where the shepherd lived who owned the golden eagle, we kept on in a northerly direction for about 12 miles; then, turning west up a valley, we left the Yarkand road, and with it known country, to try and find a new route to the Pamirs. The country as we advanced improved in character; grass became more plentiful, and camps of Wakkhi nomads were continually met with. These Wakkhis are an exceedingly interesting Aryan race of good physique, fair and decidedly European in appearance, courteous, and hospitable. We found them a charming people to travel among. Like the Kirghiz, they own immense numbers of sheep, and move from place to place in search of pasturage. During the daytime the flocks are to be seen grazing on the hillsides, and in the evening they are driven into the camp and tied up to be milked. North and south of our route magnificent snowy ranges ran east and west, connected by ridges generally about 14,500 feet high. These ridges had to be crossed, and as a rule one was included in each day's march. They presented no difficulty beyond the long ascent and descent, which was trying to the laden ponies. The only game we saw was hares and chickore; but ibex and burhel are undoubtedly to be found in the neighbourhood, as we saw their horns adorning mazars (shrines).

Near Ak Masjid we met a Russian exploring party under the command of Colonel Pevtsov. They were installed in yurts, by far the most comfortable form of movable habitation in cold weather. Owing to their transport animals having suffered considerably on the march, Colonel Pevtsov's intention was to halt for a month, in order to allow of their picking up. The escort consisted of twenty-five Cossacks, firstrate men for rough work.

After parting from the Russian party, we marched down a valley which emerged into the Turkistan plain at a small village just south of Kugiar. On our arrival at the village, a Turki brought us a lot of most delicious grapes and melons, which we thoroughly appreciated after our long thirsty march, having come 25 miles without seeing any water on the road. On the barren plain outside the little cultivation that surrounded the village, a few gazelle, or, as they are called in Turki, jeran, were to be seen wandering about apparently grazing, but what they found to eat was a mystery.

From this place we turned west once more, and crossed some low barren sandhills. It was a long trying march, more especially for the

ponies, which kept sinking in the soft sand over the fetlocks at each step. We had been going for eleven hours before Oshlegh, a charming village situated in the valley of the Tiznaf river, was reached. This valley is about a mile broad, with high cliffs on each side. The soil is a rich alluvial deposit, cultivated like a garden, and the river of bright clear water winds about from one side to the other. Apricots, mulberries, melons, grapes, pumpkins, walnuts, and apples which have a reddish tinge like blood-oranges are abundant, while Indian corn appears to be the staple cereal. Villages, in the ordinary acceptation of the word, hardly exist, but the whole valley is studded with farmhouses, and a name appears to be given to the part of the valley enclosed by each bend of the river. From Oshlegh, another march over low sandhills took us to Oyung, a village situated in a valley of much the same character, but much smaller; the river also is smaller, and almost entirely used up by irrigation canals. Ploughing was going on, the plough used being of almost the same pattern as the one the Indian peasant carries on his shoulder from his house to his field. But the cattle differ from the Indian ones in being humpless; occasionally one was to be seen yoked in a plough with a pony.

For two days we marched up this valley, camping the first day at Thangneassi and the second day at Mazar Urzi. Innumerable donkeys were met with on the road, carrying pine poles from the fir-clad slopes to be seen in the south to Kargallik, to be used in the construction of a new bazaar. At Mazar Urzi, where three valleys meet, the character of the crops was quite different from that of those further down. Oats and peas had taken the place of Indian corn, and the soil was of a much poorer and more stony character. Turning up the westernmost of the three valleys, and crossing an easy pass covered with grass and trees on which many Wakkhis had pitched their tents, we descended into a narrow gorge running between stupendous cliffs, which rose sheer up from each side to such a height as almost to shut out the light. At midday, with a bright sun shining outside, the bottom of the ravine was wrapped in twilight.

Before reaching the small fort of Eghi Zarak Kurghan, beside which we camped, we were out of this marvellous gorge and in the full light of day once more. The fort is a rectangular building about 50 yards square, with walls about 12 feet high, of dried mud. It contains no garrison, but the officials connected with the copper-smelting carried on there have their quarters in it. These officials, although Turkis and Mohammedans, wore pigtails, a custom adopted from their Chinese masters, who insist on all officials following the Chinese custom as regards the way they dress their hair. I found afterwards that many Turkis other than officials followed the same fashion, in order to curry favour with the powers that be. Close to the fort there is a small stream containing abundance of small trout-like fish. Major Cumberland tried

them with a fly, and found that they rose readily, the result being a dish of fish which was excellent eating and a pleasant change. From Eghi Zarak Kurghan we crossed the Arpatalla pass and descended to the village of Langar, which is situated just below the junction of the Tung and Yarkand rivers, amidst barren precipitous mountains. The ferry is about a mile above the village, but no rafts are kept ready; when wanted they are made by the villagers from inflated skins and poplar poles. This raft is tied by a rope to a horse's tail; the horse is then driven into the water and guided by a man strapped to an inflated skin who swims alongside. How our things got safely over has been a puzzle to me ever since. The raft was of the craziest description, and swayed about in the current, threatening to capsize every minute. All our things got wet, but no disaster happened, and nothing was missing when an inspection of our baggage was made in the evening.

Ablasum Beg of Sarikul, with a crowd of attendants, was on the bank awaiting us. He is supposed to be more or less insane, and is given to fits of uncontrollable passion, in which he has killed several people. We were particularly requested by his subjects not to allow him to handle our guns, or, if we did so, to say that we had no ammunition, as they much feared that, with a new sort of gun in his hands, he would be unable to resist the temptation to try its effect on some of the onlookers. To us he was civil enough, but there is no doubt about his being of weak intellect, and the Chinese are sufficiently conscious of it to have nominated his son, Kasim Beg, as ruler of the country.

It took all day to get our things over the river, so it was too late to go any further that night, and we pitched our tents close by. Next morning we moved about 4 miles up the Tung valley, and camped close to the Beg's house. There is no collection of houses forming a village, but the lower end of the valley is covered with scattered farmhouses on well-cultivated land. Hearing that the Beg expected us to pay him a state visit, we did so, taking with us some presents of cloth and brocade. He received us in a sort of courtyard, round which there was a raised platform covered by a roof supported by pillars. As we entered he met us, and, leading us to a place where a handsome Khoten carpet was spread, invited us to be seated. Then the inevitable *dastarkhan*, or repast (literally, "tablecloth") was brought in; it consisted of masses of boiled mutton, huge slabs of bread, and wooden bowls filled with curds. It was plain and wholesome food, but, though we did our best, we could make no apparent impression on the enormous quantity produced. Giving it up as hopeless, we expressed our satisfaction, and the remainder was handed over to our servants, who soon made a clean sweep of everything. We took our departure amidst a deal of bowing and much exchange of high-flown compliments. Next day we pursued our way up the valley of the Tung river, passing some scattered patches of cultivation in which slaves were working; they had originally been

stolen from the neighbourhood of Gilgit by Kunjuts and sold to the Sarikolis. They seemed quite happy, having married and settled down, and expressed no wish to return to their native country. Soon the valley became so narrow as to be nothing but a gorge, and we were continually crossing and recrossing the river. Owing to the rocky nature of the bed, it was a very trying march for the ponies; they staggered and stumbled about over the stones, continually falling and often cutting their legs. Emerging from the gorge above the snow-line, we found ourselves at the small Kirghiz encampment of Rabut, situated on a bitterly cold spot just under the Kotli-i-Kandhar pass. Here we halted for a day, making a bargain with the people for yaks to carry our baggage over, and then continued our march.

The pass was easy with the exception of about 150 yards near the top; this bit was so bad that it took us three hours to get the animals over it. All hands had to work their hardest, as the ponies had almost to be carried over, and the altitude—about 17,000 feet—added much to the exertion both for man and beast. After crossing we descended into the valley of the Wachi river, in which there is a little poor cultivation. The houses bear evidence of the fear the inhabitants live in of their neighbours on the south, the Kunjuts; instead of scattered farmhouses, one invariably finds several houses joined together and presenting a fort-like appearance. From this valley we crossed the Ogriat pass and descended into the Taghdumbash valley at a place about 6 miles south of Tashkhurghan.

The valley of the Taghdumbash extends from Tashkhurghan to the Kunjerab pass, with a branch on the west known as the Karachunkar valley, and a smaller one in the east, up which runs the road to Raskam. The main valley has an average width, as far as the ruined fort of Khurgan i Ujadbai, of 3 or 4 miles; after that it gradually narrows. The Karachunkar valley is much narrower, being probably nowhere a mile wide, and generally much less. The scene is bleak and dreary in the extreme, a few patches of grass along the river-bank and some boortsa (*Eurotia*) on the hillsides being the only vegetation in sight as we entered; but near the passes at the head *Stipa pennata*, the crisp nourishing grass of the Pamirs, is plentiful. At Tashkhurghan there is some cultivation, but higher up a few square yards of poor-looking barley at Dubda and Khusghun is all one meets with.

Two camps of Kinghiz graze their flocks on the Taghdumbash—one having its head-quarters in the Karachunkar branch, and the other towards the Kunjerab pass. The akskals or headmen of both these encampments treated us with great politeness, and rendered material assistance by supplying sheep, milk, butter, and a sort of clotted cream, of which they consume large quantities; as also with guides to show where the *Ovis Poli* were to be found. But one of them, Kuch Mahomed Beg, akskal of the Karachunkar party, bore a bad name amongst his

neighbours, owing to his intimacy with the much-hated and dreaded Kunjuts.

We determined to try the Karachunkar valley first, and marched up it to a place called Kukturruk, just under the Wakkhis Jai pass leading to Wakkhan. There we pitched our camp by a half-frozen stream, in a sheltered spot that had apparently been used by the Kirghiz for ages to shelter flocks and herds in. The soil where the animals had stood dug out like peat and burnt readily, so we were well off as regards fuel, which is generally the great difficulty in these regions. When we got there at the end of September, snow was lying in patches on the southern slopes of the hills and in unbroken sheets on the northern. We did not lose any time in commencing our search for *Ovis Poli*, but luck was very much against Major Cumberland and myself, and after ten days' hard work he had only got two and I had only got one, so we decided to try the Kunjerab pass. Mr. Dauvergne was more fortunate, and, having got three in his first two days, he set out for the Wakkhis Jai pass, in order to return to Kashmir *viâ* Gilgit; so we parted here.

On the Kunjerab we were much more successful, but it was terribly hard work. With the very first streaks of light the *Ovis Poli* retire to the highest peaks and remain there all day, invariably choosing such a position that it would be impossible to approach them without being seen, and not descending until shortly before dark.

Besides *Ovis Poli* the Pamirs hold ibex and bears, but we did not care to go after them; wolves are very plentiful, and I saw one once. Hares swarm in parts.

As soon as we had had enough shooting, we started for Yarkand, going a few miles out of our way to visit Captain Gromchevsky and Dr. Conrad. It was a great pleasure to us meeting them, and we only regretted that time did not allow of our being longer together. Their intention was to go through Raskam. This we subsequently heard they succeeded in doing; but from Shahidulla they had attempted to cross the high land lying between that place and Polu, and, after suffering great hardships and losing all their ponies, they had been obliged to return.

At Tashkhurgan we got a letter from Captain Younghusband, who was coming through Raskam, asking us to halt in order to allow of his catching us up, so we stayed there for three days. While halted we had an opportunity of seeing the celebrated Turki game of boghlak, or the goat. In this game the head and feet of the carcase of a goat are cut off, and it is thrown on to the ground. The players then, who are mounted on ponies about 13 hands 1 inch in height, endeavour to pick it up without dismounting. When one succeeds he gallops off and the rest follow, endeavouring to take it from him; should one be successful, he in his turn is pursued by the others, and so on *ad infinitum*. It did not strike me as being nearly as good or as fast a game as polo. The

Turkis and Kinghiz, in spite of the fact that they are nearly always in the saddle, are very poor horsemen; the ridiculously short stirrups they use, the heel being doubled up under the thigh, prevents them from having any grip, and they come off with exceedingly little provocation. But they are wonderful hands at sitting still on a pony at a walk or gentle amble. On the longest march, even in the coldest weather, from sunrise to sunset, they will sit still like a bundle on the horse's back, without dismounting for a minute.

When Captain Younghusband joined us, which he did on the third day of our halt, riding in on a camel, having come 45 miles that morning, we halted another day to talk over our experiences, and then parted on our different roads, he going south towards the Kunjerat, and we north towards the Chichilik pass. This pass is easy enough, but on the eastern side there is a very bad bit of road. It seems ridiculous to apply the term "road" to it; but it is a road insomuch as it is the ordinary route from Tashkhurgan to Yarkand. It runs down the bed of a stream, and it is a case of continually wading through the half-frozen stream, or climbing over boulders. At one time a roadway ran over the bed of the stream, supported on beams let into the cliffs on each side, but now the only signs of what has been are the holes in which the beams rested.

Before reaching Yarkand we had two trying days. Having done a fair march one day, we reached a place where the only water to be obtained was salt, and we were told that it was at least 40 miles to fresh water. So we took the loads off the ponies and rested them till midnight, when we started again. The going, fortunately, was easy and all downhill, but it took us 13¼ hours to reach water, which we did at Yakir ak Kurgan, a small spot situated in the plains amidst cultivation. As our larder was empty on getting in, I started with my gun in search of dinner, and, coming on some wild duck swimming in a canal, bagged three. Copper-smelting is carried on here, the ore being brought from a place in the hills.

On November 13 we reached Yarkand, the last part of the road having been through a rich level country cut up by innumerable irrigation canals, bordered by willow and poplar trees.

One of our first duties on arrival was to pay a visit to the amban. It was market day, and the whole city was crowded with people in their best clothes, many of whom had come in from the neighbouring villages. On every side melons, peaches, and grapes were exhibited, and, from the amount of beef and mutton displayed, I judged the people to be great meat-eaters. On arrival at the yamen, or official residence, we dismounted, three big doors resembling carriage entrances were thrown open, and we walked in. The amban seated us on high straight-backed chairs, and weak tea of a decidedly aromatic flavour was produced. He then asked us all sorts of questions, and his ignorance of geography

rather took me aback; but it was my first experience of the Chinese *literati*, and I did not know how ignorant it was possible for a man arrived at years of discretion to be. Since then I have had more experience of them, and can listen with equanimity to a question that would make the most stolid caravan-driver smile. There is one question that always much puzzled me; at least a dozen times have I been asked it, and always with a feeling of uncertainty as to whether it was intended as chaff or not. It was, "Is England tributary to China?" As we left the yamen the amban saw us out, a great deal of bowing and hesitation taking place at each door as to who was to go first. He certainly treated us with both courtesy and honour, and, judged even by an Oriental standard, his manners were good. Next day he returned our visit, and drank tea with us.

Occasionally in the city we came across men with huge wooden collars on, and sometimes with one foot stuck through an enormous lump of wood bound with iron hoops; they were said to be convicted thieves, and, in answer to our inquiries, we were told that such a thing as one of them freeing himself and bolting was practically unknown. No doubt, the fact that if they did so and were recaptured they would be executed, acts as a deterrent.

One day when riding through the city I thought I saw a face amongst the crowd that I recognized. The owner caught my eye, and coming alongside my horse, said he had a letter for me which must be given in secret. I told him to follow me to our quarters; he did so, and then gave me a letter, in which I was requested to endeavour to apprehend or secure the apprehension of Dad Mahomed, the murderer of Mr. Dalgleish. Nothing was known of the murderer's whereabouts, except that he was believed to have gone east from Kashgar.

For the benefit of the reader, who may not have heard the story of the murder, I will briefly recapitulate the particulars. Mr. Dalgleish was a merchant, who for some years had traded between Yarkand and Leh. He was extremely popular amongst the natives, and had a perfect mastery of their language. The merchants especially loved him, as they found in him a just and impartial arbitrator in all their differences. The hold he had on the affections of the Turkis was wonderful, and many of them cannot speak of his death without shedding tears. Dad Mahomed was a Kakar Pathan from the neighbourhood of Quetta. At one time he had been a trader, but had become a bankrupt, and was much harassed by creditors. According to native accounts, he was much feared and dreaded all over Turkistan, and was accountable for the deaths of many men. He was over six feet in height, and powerfully built; whereas Mr. Dalgleish, though hardy and wiry, was very short and slight.

At the end of March, 1888, Dalgleish, accompanied by some

Andyani* pilgrims and Boti† servants, left Leh for Yarkand. Some distance out they were joined by Dad Mahomed, and on the fifth day after he had joined them, viz. April 8, 1888, they crossed the Karakorum pass. Dalgleish, who was ahead of the others, crossed first, and just under the crest of the pass trod down a place in the snow and pitched his tent, after which he had his tea. Just as he had finished, the rest arrived, and having taken his advice as to a suitable place, pitched theirs, and then got their tea ready. While they were drinking it, Dalgleish went to their tent. They rose up, and asked him to sit down and have some. He excused himself from drinking any tea, saying he had already had his, but sat down amongst them, and said he would take a little bit of bread to show that there was no ill feeling. The conversation then turned on Dad Mahomed's affairs, and Dalgleish advised him not to return to India at present, where he had many creditors, but to do caravan work between Yarkand and Shahidulla, and only return when he had saved enough to pay his debts. "But," he added, "it will be necessary to live quietly, and above all, restrain your love of hospitality." Dad Mahomed said, "Yes, but we have a saying that no man ever ruined himself by kindness to others." Dalgleish answered, "Yes, that is true, and kindness to others is remembered in the next world as well as in this; but still I advise you to restrain yourself." Shortly after this Dad Mahomed rose. Dalgleish asked him where he was going. He said, "I will be back directly," and went out. He then went and got his gun, and coming behind the place where Dalgleish was sitting, fired through the tent. Dalgleish, struck through the right shoulder, uttered a cry, staggered forward and endeavoured to escape to his tent where his arms were; but his assailant interposed, attacking him with a sword. Dalgleish did all that an unarmed man could do, endeavouring to close, and even seizing the sword-blade between his hands; but what could an unarmed do against an armed man? The only thing that delayed the inevitable result was the thick clothes Dalgleish had on, and the difficulty of cutting to effect through them. At last Dalgleish fell on his face in the snow, and Dad Mahomed, standing over him, continued hacking till all was still. The Botis and Andyanis, terrified, stood looking on, and did not come to the rescue, though Dalgleish's dog showed them an example, and gave them an opportunity by seizing the murderer by the leg. After the murder Dad Mahomed made Dalgleish's servant prepare a meal for him, and then quietly went to sleep on his victim's bed, first making the Andyanis swear, on what purported to be a Koran—though I believe it was not one, there not being one amongst the party—that they would not tell what they had seen. But as one of them told me, "We swore with our lips, but in our hearts we said we would." The Botis wanted

* Russian Mussulman subjects, inhabitants of Ferghana.
† Buddhist in Ladakhi.

to return to Leh, but the murderer made them go several marches further on, and then cut off their pigtails and told them to be off. As they retired, he fired several shots at them to quicken their movements. Separating near Killian, Dad Mahomed and the Andyanis made their way by different routes to Yarkand. There the Hindu and other merchants from British India were very much excited about the murder, and going in a body to the yamen, requested that the murderer be arrested; but the Chinese officials would not do anything, excusing themselves on the plea that neither the murderer nor his victim were Chinese subjects. After passing a few days in Yarkand, the murderer quietly continued his way to Kashgar, and although his presence there was well known, he actually having appeared before a mandarin to answer a charge of indebtedness brought against him by a Kashgarian called Mojhaidin, and although the Russian Consul, Mr. Petrovsky, repeatedly urged them to do so, the Chinese officials refused to arrest him, and he left Kashgar by the Aksu road, after which he disappeared from view.

When I received instructions to apprehend him, it seemed to me an impossible task. Here I was in a Mohammedan country where the people would almost to a man aid the murderer and obstruct me. There was no police to assist. Being a European and consequently conspicuous, all my movements would be known, while the murderer could pass anywhere unobserved. The whole idea appeared to me impracticable, but subsequent events showed that Captain Ramsay, with whom the idea had originated, was correct in his estimation of its feasibility. On receiving the letter, I was quite nonplussed as to how to begin. It seemed to me absolutely certain that Dad Mahomed would not give me a chance of getting near him myself; so if anything was to be done it had to be done through well-bribed natives of the country. But where were reliable natives to be found? There was not a man in the country personally known to myself, and, for all I knew to the contrary, the first man to whom I said anything would go straight off and tell the murderer. Thinking it over, I determined to consult one of the small Hindu trading community living in the city; they, I knew, would have no sympathy with a Mohammedan and a murderer. So I sent for one that seemed an intelligent man, and asked his advice. He said at once, "Consult Mahomed Yunnus, akskal of the Badakshis; he is not only a straightforward man, but he hates all Kakars and Dad Mahomed in particular." Taking the Hindu's advice, I sent for Mahomed Yunnus, who, as the Hindu had anticipated, turned out to be very keen on having the murderer arrested, and offered to lend me his brother and several more men to aid in the search. After consulting him, I started for Kashgar to find out if I could get any information there before completing my plans, while Major Cumberland left by the Marallashi road to look for stags.

On arrival at Kashgar, I found that Mr. Petrovsky was away on leave, but Mr. Lutsch, who was acting for him, gave me all the information in his power. He was, however, unable to form any conjecture as to where the murderer was likely to be, so there was nothing to do but search. One party I sent to Balkh and Mazar i Sharif to watch that country. They took with them a letter written in Persian, explaining who they were and what they were doing; but it was only to be shown to high officials, or in case of urgent necessity, such as in the event of their being arrested as spies by the Afghan authorities. Another party were to go to Samarkand and Bokhara. Mr. Lutsch kindly gave me a passport for them, and in addition I gave them a letter written in French and English, stating that they were in search of the murderer, whom they could both identify; and I hoped that, in the event of their applying to any Russian officer for assistance, they would receive it.

Having started off these parties, I set out towards Aksu by the road taken by the murderer when he left Kashgar. What I hoped was that, if he was ahead of me, he would either go into Mongolia, where an Afghan would be as conspicuous as myself, or north into Siberia, where he would probably fall into the hands of the Russians, all their outposts having descriptions of him; or, in the event of his doubling back, he would probably run up against my parties at Samarkand, Bokhara, or Balkh.

Travelling along the road was very easy and pleasant; my baggage was carried in an araba, or cart with four horses, three being harnessed as leaders, and one in the shafts, while I rode myself. The weather was bright and frosty, and we got over the ground at about five miles an hour, just double the pace a caravan in the hills usually goes at. Aksu is the only unpleasant recollection I have of that journey. There the Chinese were a terrible pest, crowding into the serai in which I halted, regularly mobbing me. At one time it seemed as if things were going to terminate in a fight; I had determined to be good-natured with them as long as possible, but at last my patience became exhausted. One of them endeavoured to bolt with the dinner my servant had brought, and put on the table for me. Hungry human nature could not stand that; seizing the dish with one hand, I struck him in the mouth with the other, the result being a yell from the mob as he landed outside. Thinking they meant to come on, I seized a carbine and took up a strategic position in the doorway; but nothing happened—they only yelled, and I, getting tired of standing, sat down. The Russian akskal of the Andyanis, who had received instructions from Mr. Lutsch to aid me in any way, was very attentive, and assisted me in making purchases, etc. From Aksu I continued my journey east to Kuchar, a town of much the same character, and containing the same obnoxious Chinese and pleasant Turkis. About this region one also begins to meet with Tunganis, a race of Mussulman Chinese. Their physique is much

superior to that of other Chinese, probably owing to their being less dissipated and abstaining from drugs. In their manners they show a certain amount of Oriental dignity and courtesy, and none of the childish insolence of the Chinese. At Kuchar I happened to hear of a man answering to the description of Dan Mahomed, who lived further east, so I sent a man to see if it really was he. Word was to be brought to me in the jungles south of the road, whence I could have dropped down suddenly and unexpectedly at any point on the main road.

Having sent this man off, I discharged the araba, engaging five ponies as transport in its place, and then started for Shahyar, two days' march distant. But we had not gone five miles before one of the ponies dropped dead, presumedly from heart-disease; this occasioned a day's delay, as another had to be procured in its stead. Shahyar, which was reached by a double march, is a scattered village situated in a belt of cultivation running into the jungle country. Here, on arrival, I found Major Cumberland, who had come from Aksu by a southern route, keeping close to the river. We spent a couple of days together, and then parted, he going north to Yulduz, while I started west through a seemingly endless plain covered with tall feathery grass (*Phragmites communis*) and patches of spreading poplar (*Populus Euphratica*), and cut up by winding rivers. The inhabitants are extremely few in number, and consist of shepherds living in isolated huts scattered along the banks of the rivers, and having in their charge enormous herds of sheep. At one station there were said to be ten thousand sheep all owned by one man. These shepherds are an extremely nice, simple, hospitable people. On my arrival at their huts, they would run out and take my horse; then usher me in, and, spreading a felt in front of the fire, invite me to be seated while they got tea ready. At night I had difficulty in preventing them from giving up their huts entirely to me and sleeping in the open, a sacrifice that, considering that the thermometer went below zero, one would hardly expect them to wish to make.

In summer the inhabitants of the Kuchar and Bugur districts take their flocks up into the mountains lying to the north, firing the grass before leaving, but the people in the Lob district remain down all the year round. These Lob people appear to be in a much more backward state than their neighbours; their houses are simply rough shelters made from long grass, and they live almost entirely on fish caught in the rivers and small lakes with which the district abounds. The Chinese never visit the country, but I heard a rumour that they intended to establish a station there for the collection of taxes.

As regards the game to be found in the district, tigers are fairly numerous, but I never saw the tracks of a leopard, nor could the inhabitants give me any information as to their being such an animal. Stags are found, but are extremely hard to shoot, owing to the thick

jungle. As a rule, when travelling through the thick tall grass, all one sees is the tops of their antlers as they gallop off when disturbed, and getting one must always be a pure matter of chance. This stag has been often called the maral stag, but the word is misapplied, maral being simply the Turki for "hind." The stag is called bogha. Travelling east, the teran, or gazelle, becomes scarcer, evidently preferring a more open country. At the southern edge of this strip of jungle-covered country wild camels are found; they have two humps, and are smaller than tame ones. At all times they are hard to bring to book, as they wander about a great deal, and the best chance is to watch a place where they come to drink; but when snow is on the ground they don't require to drink, but simply slake their thirst by eating it. At that time it is almost a hopeless task looking for them. Wild pig are met with, but I only remember seeing one sounder, so they cannot be very numerous. Of smaller animals hares, foxes, and wild cats seem to be the chief representatives. The commonest game bird is the pheasant (*Shawii*), but to shoot it it is necessary to have a dog; without one it might be possible to travel for weeks and never discover that there was a pheasant in the country. The partridge (*Perdrix barbutus*) is found round the edges of any scattered patches of cultivation, and is a noble bird rising freely, quite unlike his Indian cousin, the grey partridge.

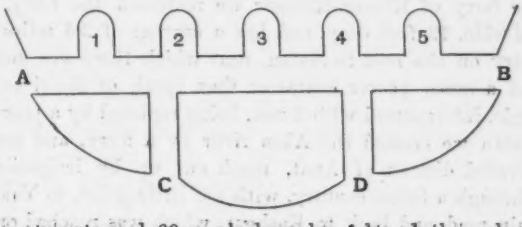
On the north of the Charan river a blight seems to have fallen on the country. The greater part of the land is absolutely without grass; dead trees lay strewn about, and some are standing perfectly dry and withered up, but perfect even to the smallest twig. A weird bit of country with one redeeming point about it—the dead trees make grand camp fires, and one has not even the trouble of cutting them down. The two lakes Shari Kumosh and Raba Kul, that are marked on all our maps, puzzled me completely. No one in the country had ever heard of them, and my route went right across the place where one of them was marked, but no lake did I see. The Yangi Darya, or New River, is said only to have existed for ten years.

As nothing had been heard of the man answering to the description of Dad Mahomed from Bugur, I returned to Kuchar by the main road running at the foot of the Tian Shan mountains, whose snowy peaks could be seen rising up above the haze that seems ever present in Turkistan. At Kuchar, where I halted for several days, a Turki who had been in India used to come and sit with me in my room in the strai. One day in conversation he told me about an ancient city he knew of built underground in the desert. I thought at first that he meant one of the ordinary buried cities of the Gobi Desert; but he insisted that it was something quite different, and explained that it was underground by the wish of the people that made it, not by reason of a sandstorm. He told me, also, that he and one of his friends had gone

there and dug for buried treasure, but had found nothing except a book. I asked to see it, and, going away, he returned in about an hour, bringing some sheets of birch bark covered with writing in a Sanscritic character and held together by two boards. I bought them from him, and it was fortunate I did so, as they have since excited a considerable amount of interest in the learned world; they are believed, by those best qualified to judge, to be the most ancient Asiatic manuscripts in existence. When I asked him to take me to this interesting place, he demurred a good deal on the ground that the people would kill him if he took a European there; but at last he consented on condition that we went at night, so as not to be seen. This I readily agreed to do, and, starting at midnight, we marched steadily forward in a westerly direction. When daylight broke we had left cultivation far behind, and were on the shoulders of a range of low gravelly hills, and away to the south a narrow strip of green with houses at intervals marked the course of a canal.

Keeping on, we came to the curious old erection from under which the manuscript had been unearthed. Similar erections are found in different parts of Chinese Turkistan, several in the Kuchar district, and one on the north bank of the river at Kashgar. They are solid and built of sun-dried bricks and wooden beams, now crumbling away. In shape they roughly resemble a gigantic cottage loaf about 50 feet high. Judging from the weather-beaten appearance they present, and taking into consideration the fact that the snow and rainfall in these parts is almost nominal, it is very evident that they must be of great antiquity. The natives attribute them to King Afrasiab, but as a general rule everything ancient is attributed by the Turkis to that monarch, who flourished about 580 B.C. Close by on the banks of a river were the remains of the ancient underground city of Mingoi, to which my guide had promised to take me. Crossing the river on the ice, I was able to have a good view of the hills that had been tunnelled to make the city. These hills appear to have been much worn away by the action of the river. High upon the face of the cliffs overlooking the water the marks of what have been habitations are to be seen, portions of the tunnelled hills having been worn away in such a manner as to show sections.

Returning across the river, I entered one of the tunnels. It was shaped as under—



AB represents a tunnel 60 yards long by 4 broad through a tongue-

shaped hill. C and D are the entrances, the hill being almost perpendicular at A and B. 1, 2, 3, 4, 5, are cells. The walls have been plastered, and what appears to be the remains of geometrical patterns could be made out. According to the natives, many similar dwellings are found in the neighbourhood.

From this place we went to Faizabad, and, having spent the night there, next day marched down the banks of a canal to Charshamba; the whole way it was like one continued farm. As the canal was free of ice, numbers of wild duck were collected in it, and I shot thirteen, mostly pintails; had I cared to do so, there would have been no difficulty in shooting very many more.

On my return to Shahyar I heard that a native had killed a tiger in a pitfall, and I asked if I might see the skin; but the owner refused, fearing that I might take it from him by force, in which case he would be punished by the amban at Kuchar, who expected to receive all valuable skins of animals killed in the district. The Turkis are quite childish in their timidity.

Leaving Shahyar on March 6, I crossed the river on the ice. It was rather dangerous work, as the ice was beginning to break up, and the day previous a man and a bullock had been drowned. However, we got safely over, but next day it would have been too late, and the only thing to do would have been to wait for a week, and then cross in a boat. It is only about 100 yards wide, but very deep.

The country on the south bank is of much the same character as east of Shahyar—forest and tall grass with shepherds' stations scattered about. South of one of these stations are the remains of the ancient city of Shahr-i-Khuttuk, now buried in the sands of the desert. The neighbourhood is considered a good place to find wild camels. The natives have all sorts of extraordinary stories about the desert. In it there are supposed to be houses with golden doors, guarded by spirits, who would punish any one bold enough to approach. A daring man from Khoten, whose cupidity was excited, gathering some kindred spirits together, undeterred by warnings, resolved to penetrate; but after going a certain distance, all the party, with the exception of one who guided them back, were struck with blindness. Since then no one has endeavoured to penetrate the mysteries of that unknown land.

At the ferry of Khoten-Khemer we recrossed the river, which is 100 yards wide, 12 feet deep, and has a current of 2·6 miles an hour. The country on the road to Matan, near which there are more buried ruins, is of a much poorer character than south of the river; the tall grass jungle, interspersed with forest, being replaced by a poor scrub.

At Matan we crossed the Aksu river by a ferry, and entered the well-cultivated district of Anat, much cut up by irrigation canals. Thence through a forest country, with but little grass, to Yaka Kuduk on the main road, and back to Kashgar, which was reached on April 1,

when signs of spring were to be seen on every side. The coldest temperature that had been registered at the consulate was zero; the greatest cold I had experienced was in the neighbourhood of Aksu, where the thermometer went down to $-10\frac{1}{4}^{\circ}$ Fahr. Shortly after my arrival at Kashgar, a messenger arrived from Samarkand with news of the apprehension of the murderer. He had been seen in the bazaar by the two men I had sent there. One remained to watch him, while the other went off with my letter to the governor, who on reading it promptly sent out a party to secure the murderer. I feel much indebted to the governor for the kind and prompt way in which he acceded to the request contained in my letter.

Possibly no country in the world has a history which is such a long succession of stories of invasions and struggles for the mastery between different peoples as Kashgaria. These peoples or nations, from the Scythians down to the Chinese, have in many cases differed enormously in race, the result being that at the present day, in the bazaar at Kashgar, amongst the natives every type of face may be seen, from the typical Mongol to the typical Aryan.

While I had been following Dad Mahomed's tracks, I received intimation that Amir Mahomed, brother of Dad Mahomed, had come from India, and was following me; so I put a man on to follow him. Thus the whole thing turned into a sort of procession. Now that Dad Mahomed had been caught, Amir Mahomed felt it incumbent on him to do something to avenge his brother. My servants got terribly frightened, as whenever they went into the bazaar they were threatened by the murderer's compatriots. On one occasion my Kashmiri cook returned much agitated, and said a Pathan had told him in the town, "You and your master are very proud of yourselves just now; but it is a long way back to India, and you are not safe there yet." On one occasion, happening to be awake in the night, I saw a man in the moonlight climb over the wall into the garden I was sleeping in. I jumped up, and seizing a carbine, tried to get a sight on him; but he slunk back into the shade, and I could not make him out. After I had waited for what seemed an age in hopes that he would show himself, he suddenly made a rush, jumped a wall, and disappeared from view.

A few days later Amir Mahomed had his throat cut, a matter of great satisfaction to me. After that I felt no anxiety, believing as I did that he was the only man in the country who would probably attempt to assassinate any of my servants or myself.

On June 13 I received information from Mr. Lutsch that the murderer whose extradition I had been awaiting had committed suicide, so there was nothing for me to do but to return to India, which I did at once, reaching Simla on August 16.

THE FALLS OF THE TSANG-PO (SAN-PU), AND IDENTITY OF THAT RIVER WITH THE BRAHMAPUTRA.

By Surgeon-Major L. A. WADDELL.

NONE of the trained Indian surveyors, so far as I remember, have yet penetrated to the falls of the great Tsang-po river, in the lower part of its course through Tibet; but by hearsay reports these falls have been placed about 29° 36′ N. lat. and 94° 171′ E. long., between the districts of Kong-bu and Pema-koi.* Under such circumstances the attached sketch by a Lama artist, who is a native of the last-named district, and who knows the place well, may be interesting; especially as all those Tibetans who have visited the fall, to whom I showed the sketch, recognized the general correctness of its leading features.

For several miles above the falls, the river runs, as already known, in a narrow precipitous defile along which no path is practicable. The falls can only be approached from below the gorge, where, as they form a place of pilgrimage, a rude monastery is located. Their height is estimated at about 70 feet, and they are enveloped, as shown in the picture, by clouds of mist and spray, and the cliffs are covered by sub-tropical vegetation, and tiger lurk in the neighbourhood.

The local Lamas relate to the awestruck pilgrims that amid the thundering water stands a king-devil of the T'ag-po type, as described and figured by me in my recent book on 'The Buddhism of Tibet,' and hence the place is called "T'ag-po." This devil is placed there under a spell by the Lamas, and when the river is low, the faithful can see his figure looming dimly through the falling waters, as indicated in the picture.

As regards the still unsettled question of the identity of the Tibetan Tsang-po with the Brahmaputra, I have seen no reference, in the bulky publications on the subject, to the evidence afforded by etymology. Now, it is interesting to note that the Tibetan word *Ts'ang-pu* is the literal equivalent of the Sanskrit *Brahmaputra*, and means "the son of Brahma." And a curious Tibetan legend associates Brahmaputra with the Tsang-po river near Lhasa. The legend relates how the son of Thi-srong-deu-tsan,† who reigned about 750 A.D., was drowned in the river, and the king ordered that the river at that spot should receive a certain number of lashes daily, as a punishment for its crime. After a time the spirit of the river, unable to endure any longer such an unjust punishment, appeared before the king *in the form of Brahmaputra*, and besought the king to cast a piece of wood into the river. On this being done, the wood was immediately carried off down stream. In this way the river-spirit showed that the water which drowned the

* See *General Report*, Survey of India Department for 1886–87, Appendix, p. xxix. Pema-koi (Padma-kod) is strictly a fiscal subdivision of Kong-bu district.

† Spelt Khri-srong-deu-tsan.

prince had long since passed on, and that the water now at the spot was wholly innocent of the offence for which it was being whipped.

FALLS OF THE TSANG-PO (SAN-PU).
(*From a native Tibetan drawing.*)

But as Hindu mythological names, such as Brahma, were unknown to the Tibetans before the reign of Srong-tsan-gam-po in the seventh century, A.D., it is practically certain that this interpretation of the Tibetan word, as synonymous with the Indian god Brahma, is of much more modern date, and is, I think, due to the Lamas, like the Brahmans in regard to many of the vernacular river-names of India, having twisted the native name so as to give it a mythological meaning.

For the common Tibetan name for the river is Tsang-po,* not Ts'ang-pu, and it means "the pure one," which is a common title of rivers in general, and evidently denoting the well-known character of all great rivers to purify themselves quickly from organic contamination. And this river, as the largest river of Central Tibet, is called "*The* Tsang-po" *par excellence;* just as the Ganges and many other great rivers are known to the natives simply as "*the* river." The upper course is called Yaru-Tsang-po, which merely means "*Upper* Tsang-po," and the province through which it here flows is called Tsang.†

Still, it is remarkable to find that the etymology of this river is so near to that of Brahmaputra, and that its root is certainly cognate with that of Brahma.

And in an indigenous work on the geography of Tibet,‡ written about two hundred years ago, the author writes, § that "the rivers of U-Tsang (*i.e.* Central and Western Tibet), on uniting, discharge into the Lohita or the Sita river." The *Lohita* is, of course, a classic Indian name for the Brahmaputra river. The *Sita* possibly is intended for Sadiya, as the Lamas often employ notoriously corrupt forms when dealing with hearsay foreign names, for the Lamaist author is unlikely to have confused it with the Sita river, one of the four great rivers of Hindu myth.

M. OBRUCHEFF'S EXPLORATIONS IN MONGOLIA.‖

The explorations of the Russian geologist, M. Obrucheff, in Eastern, Central, and South-Eastern Mongolia, throw so much new light on the orographical and geological structure of this region, including the Nan-shan highlands and parts of the Chinese provinces of Han-su and Shen-si, that they well deserve a special notice.

M. Obrucheff started for his journey from Kyakhta, and followed first the usual

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* gTsaṅ-po.

† On the other hand, it is of course possible that this river is named after the province; but improbable, as the word is, as noted, a general title of rivers.

‡ beTon-pahi-sbyin-bdag-byung-ts'ub, by gLong-rdol Lama, an author who is identified by some with the first Dalai Lama Ngag-wang Lô-zang-Gyat'so—the fifth of the so-called Grand Lamas of Lhasa.

§ gTsang bdus gnyis kyi chhu 'dres-pa la Lohita chhu-po Sita yang zer (extracted from chapter ii. page 5, of above-noted book).

‖ *Izvestia* of the East Siberian Branch of the Russian Geographical Society, vol. xxiv, part 3–4 (Irkutsk 1893); the Report of the Russian Geographical Society for the year 1893, pp. 12 *seq.*; and *Izvestia* of the Russian Geographical Society, vol. xxx. 1–4 (St. Petersburg, 1894).

route to Pekin. Thence he rapidly crossed the distance to Thai-yuan-fu, already explored by Richthofen, and therefrom he began his most interesting explorations. From this Chinese city, situated in about 37° 55′ N. lat. and 82° 15′ E. long., he went westwards, crossing South Ordos to Nin-sya, on the left bank of the Yellow river at the foot of the Ala-shan mountains. From Nin-sya he journeyed south-west, on the left bank of the river, to Lan-chau-fu, at the south-eastern extremity of the Nan-shan highlands. These highlands were crossed in several directions, and Su-chau, at the other (north-western) extremity of the highlands, was reached; the result being an orographical map of the whole system of these highlands, which finally brings some order into the bewildering chaos of mountains usually represented there on our maps. From Su-chau, the traveller's intention was to proceed eastwards, across the Ala-shan and Ordos plateaus; but he had the chance, if we are permitted to say so, to find no guides for that journey, and he was compelled to proceed north-east, down the Edzin-gol, and, further still, as far as the Gurban-saikhat mountains (the south-eastern extremity of the Eastern Altai), and thus to explore a very little-known part of Central Mongolia. After having gone so far north (43° N. lat.), he had evidently to return south-south-east in order to reach Boro-Balgasun (or Bolgisun), and thence back to Su-chau, wherefrom he now proposes to start for the exploration of the central Nan-shan, the Eastern Tian-shan, and the Toksun depression.

The importance of these journeys is self-evident. As to the general characters of the regions he has visited, M. Obrucheff describes them as follows, after having subdivided the field of his explorations into East Mongolia, Central Mongolia, the Nan-shan highlands, the Ordos, and the plateau of Eastern Han-su and Northern Shen-si.

The region between Kyakhta and Urga is described as an intermediate region between the periphery parts of Asia which have an outflow into the ocean, and Central Asia proper, which has no such outflow. Having emerged from beneath the sea much sooner than the latter, it has had time to undergo for a long time denudation by the rivers, and therefore the plateau has been divided into hills and valleys which have been excavated before the setting in of the present dry period, during which the valleys further south have been filled with loess. We have, therefore, in the north of Urga, a highland with a dominating type of what the Germans describe as *Rumpfgebirge*. [It may be added to that characteristic that, in fact, the highlands in the north of Urga belong to what the writer of these lines has described as the High Terrace of the Great Plateau of East Asia. The plateau character of this region is only masked to the traveller by the deep excavations of the valleys, but it becomes apparent when the altitudes east and west of the high-road are consulted. The usual caravan route follows here a sort of deep and broad trench, which leads gradually from the level of the Selenga to the water-parting of the Gabyn-da Can; this chain, continued further north-east by the steep slopes of the Yablonovoi ridge, constitutes the south-eastern border-ridge of the High Terrace.* The High Terrace, in all probability, has not been under the sea since the Carboniferous or the Devonian period, and it consists of crystalline unstratified rocks in the north, and crystalline slates in its southern part.]

Beyond Urga begins the lower terrace of the plateau, which has an altitude of from 3000 to 3300 feet, and is fringed, in the neighbourhood of Kalgan, by the south-eastern border-ridge. The whole represents, in Obrucheff's opinion, a plateau of marine denudation, and is covered with rough sand and gravel, but nowhere with the loess deposits which Richthofen has seen in North China. The rocks consist

* "General Sketch of the Orography of East Siberia," in *Memoirs* of the Geographical Society, General Geography, vol. v.

chiefly of crystalline schists and slates, probably older than the Sinian formation, and partly of unstratified crystalline rocks. Sheets of basalts, which probably have flown after the disappearance of the sea, cover them in some places. As to more recent formations, they are found at Baga-ude, and seem to belong to the Cretaceous; while still more recent deposits, not older than Tertiary, cover the flat heights where they have resisted denudation. After the disappearance of the interior Khan-khai sea, the present dry period began, and the finer loam of the superficial deposits has been carried away by the wind, while the heavier pebbles remain and now cover the surface of the steppe. Sandy spaces are very limited.

The eastern Gobi is often supposed to be a desert, but M. Obrucheff shows that this is not true. Eastern Mongolia has its rains, which sometimes last in the summer for two and three days in succession, and it has some snow in the winter. Therefore it is covered after the rains with patches of grass which dries up as the summer advances, but provides the camels and even the horses of the numerous tea-caravans with necessary food. Only the central depression is bare, while the remainder deserves the name of a steppe, but certainly not that of a desert. It is widely different from the deserts of the Tarim or of the Alashan.

Going now over to the Nan-shan highlands, we must abandon the idea of following M. Obrucheff in the description of his journeys in this mountain region, during which journeys he met with Mr. and Mrs. Littledale, who had crossed the western part of the highlands. Sufficient to say that the Russian geologist has crossed the whole system three times at its south-eastern end, and once at its north-western end. As to the middle parts, they have been crossed in parts by Potanin and by the brothers Grum-Grjimailo. On a small sketch-map made at Su-chau, and printed in the *Izvestia* (1894), M. Obrucheff gives the positions and the directions of the different ranges, which all run roughly parallel to each other, north-west to south-east, attaining heights up to 20,000 feet, and are snow-clad in parts, while high valleys separate them from each other. On this map an attempt is being made to connect the chief ranges of the north-western Nan-shan with those crossed in the south-east; but, on account of a want of exploration of the middle parts of the highlands, much remains hypothetical in this attempt. It may be hoped, however, that, on the ground of his detailed explorations, which he intends to continue in the central highlands as well, M. Obrucheff, helping himself with Potanin's, Grum-Grjimailos', and Littledale's surveys, will be able to give us on his return a full orographical sketch of the whole region.

In the mean time, it is well to notice his remarks relative to its leading features. As regards the name of Nan-shan ("Southern Mountains" of the Chinese), he very justly proposes to maintain it for the whole system, and to designate each of the separate ridges by a special name. Following Prjevalsky, who already has named two of the ridges of the north-western part by the names of Humboldt and Ritter, he proposes the name of Richthofen's Range for the outer north-eastern ridge of the highlands which has at its north-east foot the series of oases running from Su-chou to Han-chau and Lyan-chau (not to be confounded with Lan-chau, situated 150 miles south-south-east on the Yellow river). The second great range would be Humboldt's; it is continued south-eastwards either in the Maling-shan, or in the Tsing-shi-lin. The third range would be Ritter's; and for the fourth and the fifth the names of Mushketoff's and Semenoff's Ridges are proposed. The south-eastern continuations are evidently pierced through by the Yellow river, when it takes below Lan-chou a north-eastern direction.

Without translating the whole of the paper of M. Obrucheff on the Nan-Shan, it would not be possible to give here his many remarks relative to the characters and heights of the many separate ridges and the longitudinal valleys which separate them. Still less would it be possible to reproduce here the mass of information

relative to the geology of the Nan-shan system, which the explorer had such splendid opportunities to study during his four journeys across its whole width, and which he gives with many details.

The fossils found in a widely spread series of coal-bearing deposits will permit geologists to determine their age with exactitude, and no doubt the geological history of the region, now sketched in that paper, will appear with more completeness in later reports.

As to the other regions described by M. Obrucheff in a subsequent communication written at Hoi-syan in January last year,* we may begin with Central Mongolia. This region (which comprises the space covered in the journey from Su-chau northwards, and back to the Yellow river) is intersected by many chains of mountains and hills, always having the direction of either west-north-west or north-east. They are separated from each other by broad depressions, having the characters of either longitudinal valleys or flat depressions, enclosed on all sides by mountains. The altitudes of the depressions vary from 3400 and 3700 feet in the south, and attain nearly 5500 feet towards the South Altai, while the mountain ranges seldom rise more than 2700 to 3300 feet above the depressions, thus reaching altitudes of not more than 8200 feet. We thus have in Central Mongolia a characteristic plateau from 3000 to 4000 feet high in the south, and 5000 feet in the north, with mountains rising about 3000 feet above its surface.

A characteristic feature of the ridges of Central Mongolia (also of East Mongolia and North-Western Nan-shan) is, that they all stand on broad pedestals which sometimes reach one-half or two-thirds of their relative heights above the depressions. These pedestals have soft, smooth outlines, while what rises above them is always rocky and divided into broken, ragged peaks. This feature (whatever its cause may be) is general, but in some ridges it is especially well pronounced.

Like Eastern Mongolia, Central Mongolia, even in its worst part, the Golbin Gobi, has not the characters of a desert; it is a steppe covered with grass and bushes, and both camel and sheep find food everywhere; very often, too, the horse. Only the territory in the west of the Edzin-gol is a desert in the true sense of the word.

"Central Mongolia," M. Obrucheff writes, "completely deceived my expectations, just as was the case last year with East Mongolia. Instead of the sand deserts of our maps, I found broad ridges and rocky hills, mostly very low and much disintegrated, but certainly not sandy plains. There is very little sand indeed, and the loess, contrary to Richthofen's opinion, is wanting here as well. Broad valleys and shallow depressions occupy the spaces between the ridges, and everywhere there is vegetation. It is not a desert, but a steppe, and the poorest parts of the Golbin Gobi are oases in comparison with the true deserts of the left banks of the Edzin-gol. The Mongols of the Southern Altai told me that my two horses would not be able to cross the Golbin Gobi, as there is no grass at all, and they advised me to leave the horses with them—probably expecting to have them for themselves. But my horses have brought us quite well to San-to-kho, and though for the last couple of miles it was I who dragged the horse, and not the horse which carried me, the fault of it was not with the Golbin Gobi, but with the long journey with very few days of rest, and the long marches upon very little food; and then, the horses were not first rate creatures, and had been overworked in the Nan-shan."

The Ordos has a quite different character. In its western division, which has been visited by M. Obrucheff, a northern and a southern part must be distinguished. In the former, the plateau is covered with flat hills going in different directions,

* *Izvestia* of the Russian Geographical Society, 1894, 2.

and rising but from 660 to 1300 feet above its surface. They consist of soft sandstones, mostly horizontal, which are covered, especially in the neighbourhood of the Yellow river, by low hills and *barkhans* (low *dunes*) of sand. The southern part, down to the southern frontier of the Ordos, consists chiefly of sandy *barkhans*, with more or less wide flat depressions between them, which the Mongols name *chaidams*. These are often bottoms of dried-up salt or fresh water lakes. Similar sands cover the low left bank of the Yellow river as far north as the Khananaryn-ula ridge, which already belongs to Central Mongolia.

In the south of the sandy regions of South Ordos the country rises higher, and there begins the loess plateau of the Eastern Han-su and Northern Shen-si. On looking upon it from the plains of the Ordos, it has the aspect of a flat swelling, 1000 to 1300 feet of relative height, divided by ravines into separate parts, named "mountains" by the natives. Even on our maps, a range, Lu-guan-lin, or Bo-yui-shan, is marked; but in reality it does not exist. While crossing the region from east to west, and again from north to south, M. Obrucheff saw no range, and only found a loess plateau, divided by a labyrinth of ravines into a number of table-topped hills, all of nearly equal height. The slopes of the ravines show loess, which covers the same soft sandstones as in the Ordos. This ravined plateau has a width of about 130 miles, from the Ordos plains to the neighbourhoods of Tsin-yan-fu. Its northern part is very difficult to travel upon, on account of the ravines which one has continually to cross. In its middle, from Tsin-yan-fu to about Lin-tai, the plateau is less ravined, and is divided into table-like masses 7 to 27 miles wide. The road crosses for hours a plain covered with cornfields and villages, and then, all on a sudden, one sees a wide river-valley, cut in 1000 to 1300 feet deep into the plateau. The immense amphitheatres thus formed have their slopes in numerous small loess terraces, each of which is about 15 to 20 feet high.

The passage from the northern to the middle part of this plateau is gradual; but not so from the middle to the southern part, which may have a width of about 50 miles. Again one meets here the same countless ravines, but some order is seen in their orientation from north-west to south-east. Two ranges, separated by the valley of the Tsin-yai-shin river, may be distinguished, and from beneath the loess one sees the rocks *in situ*, which rise to the height of the plateau, and are covered on their tops with but a thin sheet of loess.

The altitudes above the sea-level are—3180 feet at San-to-kho, wherefrom the level gradually rises from the Yellow river to 4900 to 5000 feet, for the flat heights of North Ordos, and 4300 to 4600 feet for South Ordos (Borobalgasun, 4340 feet). The highest mountains attain 5900 feet in the north and 5400 feet in the south. The pass across the Lun-fon-shan range is 4430 feet, and across the Se-thu-shan 3690 feet.

As to the geological remarks of M. Obrucheff relative to the above three regions, they are in substance the following. The plateau of Central Mongolia consists of crystalline non-stratified rocks (granites, diorites, etc.), in the distribution of which the directions west-north-west to east-south-east, and west-south-west to east-north-east, prevail, partly also north-north-west and north-north-east. Crystalline shists (gneisses, mica-shists, quartzites, etc.) and half-crystalline deposits (metamorphosed sandstones and limestones), probably of Archæan formations, cover immense spaces, and they are covered in places by Carboniferous deposits, as well as occasionally by rocks of volcanic origin. The above formations make the backbone of the Mongolian plateau, which received its full configuration after the Carboniferous period. Depressions in it were covered next by the Khan-khai sea, which probably gave the above-mentioned characters to the mountains (broad pedestals and cliffs above them). This sea covered large areas, but it did not

extend over West Ordos, which must have stood above its level in the shape of a wide island or peninsula. In the explored parts of the Han-su and Shen-si provinces, limestones, probably Silurian, are seen, and they are covered with post-Carboniferous horizontal deposits. These latter are covered in their turn with a sheet of unstratified clay, attaining the thickness of from 240 to 300 feet, which is covered in its turn with loess.

The above gives, however, but a very faint idea of the extremely valuable observations of which M. Obrucheff's reports are full. If we do not sum them up with more fulness, it is only because we expect the explorer will give us a still more complete and authoritative geographical and geological description of the whole region.

In a letter dated Lan-chau, March 29, 1894, and published in the last issue of the St. Petersburg *Izvestia* (1894, iv.), M. Obrucheff gives a short account of his journey across the Tsing-ling-shan, or Eastern Kuen-lun, to the basin of the Se-chuan river. Although the journey was accomplished during the best part of the year—that is, towards the end of the winter and at the beginning of the spring—the Russian explorer describes it as the most unpleasant part of all his travels. Neither the picturesque mountains, rocks, and gorges, nor the rich southern vegetation of fan-palms, bamboos, and other sub-tropical plants, can sufficiently reward the traveller for the bad roads, the clouded sky, and the discomfort of nights spent in dirty Chinese hotels amidst an obsequious population. He was happy to return once more to the less brilliant, cold, and dusty nature of the north.

On his way from Lan-chau to Guan-yuan, *viâ* Fin-syan, Khoi-syan, and Lu-yan, M. Obrucheff partly followed the route of Richthofen; but on his back journey to Lan-chau he crossed the Eastern Kuen-lun further west, passing through the towns of Tse-chau and Min-chau, and thus touching in some places the route followed by Potanin. The geological data collected during the southward journey fully confirm Richthofen's generalizations; M. Obrucheff only remarks that he found, amidst the older deposits, in the neighbourhood of the towns Khoi-syan and Lyan-dan, wide, nearly horizontal deposits of Mesozoic and, perhaps also, Kainozoic age, very similar to the Khan-khai Sea deposits, which show that the sea deeply penetrated at that time into the valleys of the Eastern Kuen-lun. The Ta-lyang-shan ridge, in the south of Khoi-syan, represents the southern limit of the Loess.

As to the part of the Kuen-lun which was visited during the back journey *viâ* Tse-chau, its orographical structure is similar to what Richthofen saw further East. The chains and valleys are due to a mighty erosion; there are no "tectonic" longitudinal valleys, and the rivers flow in transversal valleys, eroded across the ridges. The Archæan granites and gneisses and the mighty U-tai formation are missing; but Cambrian or Lower Silurian deposits are widely developed. So also representatives of nearly all subsequent formations, up to the Tertiary deposits of the Khan-khai Sea and the Loess. The latter appears sporadically in the north of Pi-shan; but the Ling-yang-shan ridge may be taken as the southern limit of the mass deposits of the Loess.

Great dislocations in the directions W.N.W. to E.S.E. in the northern part of the region, and W.S.W. to E.N.E. in its southern part, have built up this system of highlands, and the dislocations have lasted, gradually diminishing in intensity, since the formation of the coal-bearing parts of the Carboniferous system till after the retreat of the Khan-khai Sea.

Since the above letter was written, M. Obrucheff has returned, *viâ* Kulja, to St. Petersburg, and he has delivered before the Russian Geographical Society a lecture on his journeys. Only a very brief report of this interesting communication has hitherto been published in the papers.

PHYSICAL GEOGRAPHY AT THE VIENNA CONGRESS.

As already mentioned in the Monthly Record, the geographical section of the Science Congress at Vienna last September was, during part of its sittings, divided into a number of sub-sections, one of which concerned itself exclusively with physical geography and oceanography. Special efforts were made by Professor Penck to obtain a programme for this latter which should be thoroughly representative of recent work in all departments of the subject. At a sitting devoted to the new science of limnology, the work of Dr. H. R. Mill in the Clyde sea-area and in the English lakes was discussed, and M. A. Delebecque's atlas of the French lakes exhibited. Dr. J. Müllner (Gratz) described the atlas of the Austrian lakes, of which the first part, including the lakes of the Salzkammergut, is ready for publication. The second part is in preparation, under the editorship of Professor Penck and Dr. E. Richter, and will deal exhaustively with the Carinthian lakes and the northern part of the Lake of Garda. In this connection, Dr. Richter read a communication on his soundings and temperature observations in the Austrian part of Lake Garda. Over 120 soundings have been made, a relatively much larger number than has been made by the Italians, who have only 400 in an area twenty times as great. The greatest depth in the Austrian section is 170 fathoms against 189 fathoms in the Italian; the relief of the basin is extremely simple, the banks sloping steeply down to a point where the bottom forms a comparatively level plain. The channel of the Sarca is only indicated by a sublacustrine bar, in strong contrast to the well-marked course of the Rhine through the Lake of Constance, and of the Rhone through the Lake of Geneva. The distribution of temperature is remarkable, as appears from the following—

Depth (fathoms)	0	11	16	27	55	144 to 170
Temperature (Fahr.)	66·2	65·1	55·8	50·0	46·0	45·9

which discloses the presence of a "transition layer" (*Sprungschicht*) between 11 and 16 fathoms, with a sudden drop in temperature of 9·3° Fahr. The 45·9° Fahr. reading is the highest bottom temperature yet observed in a European lake.

An interesting account was given of Mr. L. von Loczy's (Budapest) work for the Hungarian Geographical Society in the Balaton lake, which has taken the form of a complete hydrographic survey, including soundings and measurement of surface levels. So far as the work has gone, the results show that the southern part of the lake is very shallow; the banks go down steeply to a depth of about 5 feet close to the shore, and in the middle of the lake the depth is barely 2 feet greater. The maximum depth—35 feet—is found near the Tihany peninsula on the north-western side, in the narrowest part of the lake, and in this strait the wind produces a current which sometimes attains a velocity of 1¾ to 2 miles an hour. Evidence of the occurrence of "seiches" — waves due to differences of barometric pressure at the two ends of the lake—has also been obtained, and their period has been estimated at 43 minutes. A network of meteorological stations round the Balaton lake provides data for investigating, in the first place, the nature and amount of its water-supply, and both in the wide steppe region to the south and the hilly country to the north phenological observations are being made with the view of ascertaining what influence the lake has on the districts surrounding it. The geological investigation of the basin by borings has shown that to the south the bottom is sand; to the north, mud 30 feet thick in places; and underneath, a stiff tenacious clay. Some 18 feet below the surface of the water a bed of peat was bored through, showing that at one time the level of

the lake was much below its present position: and there are marks of water as much as 100 feet above the present level, indicating a wide range within comparatively recent times. High levels are recorded in 1776, 1820-22, 1857, and 1879. In 1865 the surface of the lake was 7 feet lower than in 1879, the volume of water thus doubling itself in fifteen years. The physical results obtained so far are to the effect that the waters of the lake are grey in colour, and that the winter covering of ice attains a thickness of 18 inches. Biological investigations have disclosed the presence of 460 animal species and a varied microscopic flora. Special attention is being directed to the Plankton.

Among the more strictly meteorological communications, those of Dr. Woeik of (St. Petersburg) were of special interest. From recent observations, Dr. Woeikof has been confirmed in the belief that the intense winter cold of North-eastern Siberia is a very local phenomenon. In January, 1893, the air temperature recorded at a valley station in the province of Yeniseisk was 30·6° Fahr. colder than at a neighbouring station 1000 feet above it, and further to the north-east intense cold in the valleys must be of frequent occurrence. If elevation is taken into account in discussing the records of Siberian stations, a great pole of cold is not recognized in the north-eastern part of that area, but it is found that a stratum of air having a lower mean temperature lies over Greenland (Nansen's observations) and the North American archipelago, as well as over the Antarctic continent. In another paper Dr. Woeikof discussed the day temperatures of the lower layers of air, as observed by the Assmann aspiration psychrometer. The observations showed that with bare soil in full sunshine the air resting immediately on the ground was 22° to 36° Fahr. warmer than that three-quarters of an inch above it, and that this layer again was 4·5° to 6·5° Fahr. warmer than the air 20 inches from the ground. At 20 inches the temperature was still 1·5° Fahr. warmer than in a Wild's shelter 10 feet from the surface. The rate of fall of temperature close to the ground is certainly remarkable.

Dr. Brückner (Berne) discussed further researches on the effects of variations of climate on farming, pointing out that in oceanic and insular climates a bad harvest was usually caused by excessive rain, while in continental climates droughts were more frequently responsible for damage to crops.

On the motion of Dr. Neumayer (Hamburg), the combined sections representing geography, geodesy, meteorology, and physics, passed the following resolution expressing their sense of the immense importance of Antarctic exploration to all branches of science: That the Association of German Scientists and Physicians desires to urge upon the German Geographentag the advisability of directing its special attention to the question of penetrating and exploring the Antarctic continent, at its meeting at Bremen in April, 1895, and of ensuring that the views of German specialists shall be adequately expressed at the International Geographical Congress in London in 1895. In support of these efforts, it is proposed that a report should be drawn up embodying scientific opinion generally on the subject, the report to be presented at the next meeting of the Association in Lübeck.

During the sittings of the Association an exhibition of objects bearing on geography and geology was held in the rooms of the University.

GEOGRAPHICAL WORK BY THE GEOLOGICAL SURVEY OF CANADA IN 1894.

By Dr. G. M. DAWSON, C.M.G., F.R.S.

Some geographical results of importance have again been obtained in connection with the operations of the Geological Survey of Canada during the year 1894, although but two parties have been at work in what may be called the unexplored regions of the Dominion. These were conducted by Mr. J. B. Tyrrell and Mr. A. P. Low.

In the *Geographical Journal* for March, 1894, it was stated that Mr. Low, after having completed the first part of his exploration in the Labrador peninsula, proceeded to Hamilton inlet, on the Atlantic coast of Labrador, for the purpose of passing the winter there, and in preparation for further work in the spring, by carrying inland as far as possible the necessary supply of provisions for the season's operations. With this object several men were sent up the Hamilton river with loaded canoes late in October. They succeeded in ascending the river about 100 miles, when they were stopped by ice. Câching the supplies here, they subsequently returned to the inlet on foot when the ice became strong enough for travel. A second party, under Mr. Low's assistant, Mr. Eaton, ascended the river for some distance, in January, hauling provisions in sleds, and early in March, a sufficient quantity of snow being on the ground to render travel over the rough ice possible, the main party started for the interior. The efforts of the party were then directed to moving forward the provisions from the câches already established, and by dint of much hard work and repeated trips to and fro, the supplies and canoes were carried inland as far as the vicinity of the Great Falls before the ice became unsafe. The Great Falls, it will be remembered, mark the furthest point reached by the Bowdoin College expedition in 1891.

At the end of May it was found practicable to launch the canoes and to proceed with the exploration by water. Sandy lake, into which the two main branches of the river flow, was made a base of operations. The south-west or Ashuanipi branch, with its lakes, was first examined; after which the survey was carried northward to Lake Michikamow, which proved to be some 80 miles long by over 30 miles in greatest width. The waters of this lake reach Hamilton inlet by the north-west river.

Having again retraced his route to Sandy lake, Mr. Low finally left that place on August 1, following up the south-east or Attikonak branch of the Hamilton southward to the height of land separating its waters from those of rivers flowing to the gulf of St. Lawrence. By means of the Romaine and St. John rivers the shores of the gulf were eventually reached near Mingan on August 22.

The explorations and surveys of 1894, taken together with those of the preceding year, give very important information on the geography and physical character of the interior of Labrador, including its geology.

Further particulars relating to this work will be given by Mr. Low in a paper to be presented to the Royal Geographical Society.

To the west of Hudson bay another line of exploration and survey was carried through the region of the Barren Lands by Mr. J. B. Tyrrell, who was accompanied by Mr. R. Munro Ferguson. This lay to the east of that followed by him in 1893, of which an account has already appeared in this *Journal*.* The route chosen was by way of Reindeer lake, situated in the northern part of the drainage basin of the Churchill. The journey from Grand rapids, near the mouth of the Saskatchewan, to the Du Brochet post of the Hudson's Bay Company, at the north end of Reindeer lake, involved a canoe voyage of about 600 miles by rivers and lakes already more or less completely surveyed.†

At Du Brochet post two Chippewyan Indians were secured as guides for the new country lying beyond. A stream named Ice river was first ascended for some distance to a portage route which led by Thanont and Theitaga lakes to Kasba lake, at the head of the Kazan or White Partridge river, in latitude 61° 10′, at a distance of 221 miles from Reindeer lake. Thanont and Theitaga lakes discharge their waters by the Thlewiaza river to Hudson bay.

The Kazan river was followed down to Ennaida lake, which lies at the northern edge of the wooded country, and here the Indian guides turned back. Some days later, and further to the north, the first camp of Eskimo was met with, and two of these people were enlisted as guides. Yath-kyed lake was subsequently reached, and the whole length of its west shore was examined. When in latitude 63° 7′, it was definitely ascertained that the Kazan discharged into Baker lake at the head of Chesterfield inlet, and, in consequence of information obtained from the Eskimo, it was determined to make a series of long portages to the eastward, by means of which another river was reached. This, being descended, was found to discharge into Hudson bay about latitude 62°, and the shore of the bay was attained on September 18. Fort Churchill was reached on October 1, and after waiting some time for the complete freezing over of the rivers and lakes, the return journey was begun with dog-sledges, by way of Split lake on the Nelson river, to which a track survey 275 miles in length was made on snow-shoes.

The route followed from Reindeer lake to the shore of the bay was about 815 miles in length, and by means of this survey and that of the previous summer it will now be possible to place most of the large lakes and rivers to the west of Hudson bay upon the map with some accuracy. The rocks met with along the entire route are almost exclusively referable to the Laurentian and Huronian systems, the area of Animikie rocks found in 1893 not extending so far to the east and south as the Kazan river.

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* November, 1894. † 'Report of Progress, Geol. Survey of Canada, 1879–80, part C.

THE MONTHLY RECORD.

EUROPE.

The History of the Development of the Danube. By Dr. Roman Hödl.*—The transverse passage of the Danube across the southern end of the Bohemian mountain system, *i.e.* broadly speaking, between Passau and Vienna, takes place, more strictly, in several distinct passes, since the southern end of the primitive rock-system sends a series of distinct limbs southwards, between which the Tertiary deposits from the south are interposed. The course of the Danube cuts across the southern end of the Bohemian system without regard to details of geological boundaries, taking a course from west to east now across the primitive, and now across the more recent formations, while only in places does its stream follow a line coinciding with the limits between the two. There is thus an alternation between narrow, deeply cut, rocky valleys, and more level expanses open towards the south. The passage of the Danube through this region is but rarely touched upon in literature, though the opinion has been occasionally expressed, but only as a conjecture, that its valley is pre-diluvial. A special treatise on the subject has not yet, to my knowledge, appeared. One small essay only deals with a tributary valley, that of the Inn, which empties itself into the rocky valley of the Danube near Passau. This essay, by Franz Bayberger (Kempten, 1886), is entitled, 'The Transverse Valley of the Inn from Schärding to Passau,' and in it the opinion is expressed that this transverse valley, which has a depth of from 300 to 650 feet, is *interglacial*, from which the necessary conclusion would follow, that the formation of the Danube valley also took place *during* the Ice Age. A detailed examination of the section from Linz to Krems has now shown that all the three terraces of the Alpine borderland—viz. the diluvial deposit, the high terrace, and the low terrace, can be traced throughout this part of the Danube valley. The diluvial flat sinks gradually from the Alps to the Danube, and is still cut through by that river at the present day, so that even on the left bank portions of terrace belonging to the diluvial flat are to be found. The deposits consist principally of fragments of quartz and limestone, covered with a layer of loess. The average depth is 115 to 130 feet. In the valleys of the Alpine tributaries the upper terraces project downwards into the Danube valley, and end there with a height of from 65 to 100 feet. They likewise consist of limestone and quartz fragments, the limestone predominating in the eastern section in Lower Austria. These deposits too are overlaid with loess. Lastly, the lower terrace is to be found on the valley floors, and here the loess is wanting. Occasionally the southern flat appears higher than the northern, as, *e.g.*, at the mouth of the Traun. We have here a large cone of detritus brought down by the Traun, which has been cut through by the Danube. This cone of detritus sinks from south to north, and, inasmuch as the Danube valley is 3 to 4 miles broad, the southern escarpment (230–300 feet) is considerably higher than the northern (130–160 feet). In a section, a line drawn in the direction of fall of the cone of detritus exactly strikes the northern terrace. These terraces continue at the present day through the rocky narrows, and allow the conclusion that the passage through the range is *pre-glacial* and has been deepened since the first glaciation to the extent of, in round numbers, 130 feet. In this process an amount of material of about $3\frac{1}{8}$ cubic miles must have been removed between Linz and Krems. On a more extended excursion from Passau to Linz, which is to be followed by a more detailed study, altogether analogous conditions were observed, and we can have no hesitation in putting down the whole passage of the Danube through the Bohemian mountain system as *pre-diluvial* or *pre-glacial*. Besides the above-mentioned terraces, an additional one is met with at a height of about 320

* Communicated by Dr. Peucker.

feet, which is particularly well marked between Ybbs and Melk, and, as it displays nothing but quartz, must owe its origin to a *tertiary stream*. Now, since a deposit of tertiary sand also is found near Melk beneath this bed of shingle, we see from this that we have in this locality a valley which was formed before the Neogene, and thus *during the Tertiary epoch*. Further, a valley with Tertiary deposits can be followed from the Danube behind the Ostrong and Jauerling until it reaches the Danube again, and allows us to lay down a pre-neogen valley system. Thus, as a result of the recent investigations, we arrive at the following conclusions: (1) The deposits left behind by the thrice-repeated glaciation of the Alps, can be traced in the Danube valley from Passau to Krems. (2) The transverse passage of the Danube through the Bohemian mountain-system is *pre-Glacial*, and in many parts *pre-Neogene*.

ASIA.

The Baluch-Afghan Boundary Commission.—The work of this Commission, which is to deal with the whole extent of the Afghan frontier from the Gomul to Persia, is making good progress. During 1894, Captain R. J. H. L. Mackenzie accomplished a large out-turn of survey in connection with the Commission, the amount of actual new work being extended over a little more than 4000 square miles of country, while triangulation was carried on from sixteen new stations. The number of miles of boundary actually demarcated in the same period (nine months, March to December) was 300 miles, a most creditable piece of work. Captain Mackenzie also joined in with the Waziristan survey on the one side, and the Kandahar survey on the other, while he also continued his labours with the Takht-i-Suliman and Zhob surveys. Most of the plane-tabling was done by Gopal Singh, sub-surveyor, under difficulties of no ordinary character. Lieut. Benn, of the Sind Horse and Bombay Staff Corps, has been diligently collecting military information for the Intelligence Branch, respecting the country from Domani on the Gomul to New Chaman, while new routes through Southern Afghanistan have been examined and joined up with those already visited. Various unknown tracts have been reported on, including the province of Tirwa, which has hitherto been almost a *terra incognita*. Captain McMahon, assisted by Khan Bahadur Haq Nawaz Khan, has been engaged on the above-mentioned demarcation, and has thus completed the first section of his long task. The mission is now expected to move southwards, defining the boundary between Shararud and Shorawak to Nushki, whence it will enter a waterless tract and run southwards of the Helmand river, across the Lut desert, to the Persian frontier. It is hoped that the borders of Persia may be reached before the hot season sets in. Another sectional party of the Commission is engaged in the valley of the Kunar river, where, under the supervision of Mr. Udny, it will lay down the boundaries of Afghanistan and Chitral, with special reference to the claims of Umra Khan, of Chandawul, on the one side, and the Kaffirs on the other, both these parties occupying intermediate tracts in the valley. It is these conflicting jurisdictions that have prevented this direct and valuable route between the Indus and the Oxus from being hitherto used as fully as it should have been.

Dr. Sven Hedin's Explorations in Central Asia. We have received a letter from Dr. Sven Hedin (see *Journal*, vol. iv. p. 457), dated at Kashgar, January 12 last, in which, while promising the early despatch of an article descriptive of his four ascents of Mount Mustagh-ata, for publication in the *Journal*, he also gives some details as to his plans for future operations. He was intending to start in another ten days for Maralbashi *en route* for the Mazar-tagh (discovered by Prjevalsky between the Yarkand and Khotan rivers). He next proposes to explore the interior of the Tarim desert, and then to attempt to reach the mountains of Northern Tibet, perhaps visiting Lob Nor on the way. At Kashgar Dr. Hedin

had met Mr. and Mrs. Littledale, and speaks of the great pleasure which he derived from their society. They had, after some uncertainty as to their future route, eventually decided on that *viâ* Khotan, intending to attempt the ascent of the Tibetan plateau by way of Cherchen. Dr. Hedin expresses his doubts as to their success, with only camels and donkeys, in view of the experiences of Pievtsov and Grombchevsky, when making the same attempt. He considers that yaks alone can cross the plateau. Mr. Littledale, if unsuccessful in the attempt to reach Lhassa, would return to India *viâ* Leh.

AFRICA.

Visit by Consul Churchill to Table Mountain, Mozambique.—In a despatch kindly forwarded to the Society from the Foreign Office, dated November 16 last, Consul Churchill encloses an account of a visit to Table mountain (Meza in Portuguese), which lies midway between the head of the Nakala inlet of Fernão Velloso bay and that of Conducia bay, a little north of Mozambique. It was by this latter bay, and the river Sinyudi, which empties into it, that the base of the mountain was approached. There is deep water throughout the centre of the bay, and above Bar point is a deep and sheltered basin. A boat may navigate the river for about 8 miles in three hours during spring tides. The lower part is surrounded by mangroves, but higher up the banks become steep and show signs of receiving a fair volume of water, but there was no fresh water at the time of the visit (the end of the dry season). An advance being made on foot, the dry bed of the river was crossed higher up. About 2 miles from the base of the mountain are numerous deep gullies filled with luxuriant tropical vegetation—the first seen by the writer in the vicinity of Mozambique. Attempts to find a practical route for the ascent having failed on the south and west sides, owing to the almost perpendicular walls of rock, a native guide was at last found who led the party to the summit by the usual path at the north-east end. The summit, which is nearly level—the aneroid showing 990 feet as the greatest,* and 700 feet as the least elevation—was covered with thick forest, so that it was difficult to obtain a view; but where this was achieved, the surrounding country was seen to be very flat and monotonous, consisting of forest of a prevailing light brown colour. The mountain is composed of sandstone, covered on the top and near the base with rich dark mould. Its summit measures about $1\frac{1}{4}$ by $\frac{3}{4}$ of a mile. The district round the mountain (Matibani) is rich in timber, the principal kinds being African teak, ebony, and mahogany. Little game was seen, but it is said to be plentiful in the rains. Aided by the forest, the inhabitants of the neighbouring district of Nakusha, though probably not over 1000, are able to hold their own against intruders, and their head chief occupies a perfectly independent position.

British Central Africa.—By the agreements signed on November 24 last, between the Right Hon. Cecil Rhodes and the British Government, the provisional arrangements under which the Imperial Commissioner for territories under British influence north of the Zambezi exercised a general supervision over the territories of the South Africa Company north of the Zambezi, will come to an end not later than June 30, 1895. While the British Central Africa Protectorate will remain, as hitherto, under the control of the commissioner, the rest of the territory within the British sphere up to Lake Tanganyika will be under the control of the company's administrator at Salisbury. We may expect, as a result, a speedy increase in our knowledge of the wide districts north of the Zambezi (including a large part of the Barutse country) for which we have hitherto depended on the accounts of a few travellers, such as Holub, Selous, Capello and Ivens, and Thomson. A paper by the last-named

* The true height is given as 1095 feet.

is to be found in the *Geographical Journal*, vol. i. (1893), p. 97, while for the north-eastern parts of the territory, which are rapidly becoming better known, we may refer (in addition to the works of Livingstone and Giraud) to the accounts of the journeys of Mr. Alfred Sharpe, published in the R.G.S. *Proceedings*, 1892, p. 36, and *Journal*, vol. i. (1893), p. 524, and to the interesting reports appearing from time to time in the *British Central Africa Gazette*. In the territory of the South Africa Company south of the Zambezi, the question of the boundary with the Portuguese possessions on the east is still pending. The accurate determination of positions necessary to the delimitation of the boundary was carried out by the English and Portuguese Commissions, but the matter at present in dispute is one of the interpretation of the agreement of 1891, which fixed, as the line to be followed, "the upper part of the eastern slope of the Manika plateau," and it appears to be a point at issue whether the word "plateau" should include the hilly borderlands, or only the more level country further west. The question is under arbitration.

Map of the Neighbourhood of Timbuktu.—A map is published in the *Comptes Rendus* of the Paris Geographical Society (1894, Nos. 18, 19), which presents some new details respecting the country on the left bank of the Upper Niger south-west of Timbuktu. Compiled by Lieut. Bluzet, it embodies both the personal observations of this officer and other information collected by the French military authority in those parts. In particular, the north-western limit of the inundations of the Niger is carefully laid down, together with the various lakes and back waters which connect with the stream. An extensive swampy depression due west of Timbuktu, known as the Lake of Fagnibine, is also shown. This is connected with the Niger by the channel which passes the town of Gundam, one of the French administrative centres, the neighbourhood of which is shown with greater accuracy than in previous maps.

Export of Ivory and Caoutchouc from Africa.—From the *Mouvement Géographique* (1895, No. 1) we gather the following details respecting the recent exports of these articles. While the total amount of ivory received in London in 1894 was considerably less than the average for the former three years, that received at Antwerp, though less than in 1893, was far above the same average. A certain amount which formerly found its way from Central Africa to Zanzibar has lately been exported *viâ* the Congo, by which route also some of that exported from the Central Sudan has reached the coast. From the same parts a large quantity has been carried across the Sahara to Bengasi, on the Mediterranean, so that Egypt is no longer the sole recipient of this supply. Although the amount from East Africa has fallen but little short of the mean for the former five years, its inferior quality points to a great diminution in the future. While the qualities received from the Niger, Cameroons, and Gabun have fallen considerably of late years, the increase from Central Africa has maintained the total export from the West Coast. The quantities of caoutchouc received in Antwerp have steadily increased from 4·6 tons in 1889 to 270 tons in 1894, and the quality has also improved, through greater care in its collection. Antwerp appears destined to become the principal *entrepôt* on the Continent for this article.

Portuguese West Africa.—The *Mouvement Géographique* (1894, p. 112) gives figures showing the progress made in the commercial development of Portuguese West Africa since the beginning of the railway from St. Paul de Loanda to Ambaca. On July 30, 1894, this line had been opened for a distance of 175 miles. Since 1886, the year in which work was begun, the customs receipts at Loanda have been more than quadrupled. The gross receipts of the line have also risen from 1147 francs per kilometre in 1890-91 to 2178 in 1893-94.

NORTH AMERICA.

Glacial Phenomena of Newfoundland, Labrador, and Southern Greenland.—Mr. G. J. Wright, in an article in the February number of *the American Journal of Science*, gives the results of his observations, made in connection with Dr. F. A. Cook's expedition to the Arctic regions in the summer of last year, upon the glacial phenomena of Newfoundland, Labrador, and Southern Greenland. The most important inferences deduced from the facts he observed are, that the ice-sheet of Southern Greenland formerly sent glaciers down through all the fiords, filling them to a height of about 2000 feet, and pushing even to the margin of the continent. Greenland has therefore had its ice age, which has already partially passed away. During the maximum of the ice extension the mountains bordering the sea in Southern Greenland formed innumerable nunataks. The ice was not thick enough to cover them in solid mass, and there is no probability that the ice extended far out into Davis Straits. On the other hand, it is pretty evident that in Labrador and Newfoundland all the mountains were completely covered with glacial ice, which extended far out over the bordering continental plateau. But this was at that time probably elevated above the sea-level, so that it is doubtful if the ice ever extended far into the sea. The facts point to considerable pre-glacial elevations of land followed, in Labrador at least, by a period of extensive depression below the present level, and subsequent partial elevation. The freshness of the glacial striæ in exposed places, and the small amount of modification which has taken place in the topography since the retreat of the ice, sustains the abundant evidence elsewhere found of the recent date of the glacial period; while the indications of recent changes of level point to terrestrial rather than astronomical causes to account for the vicissitudes of the glacial period.

Alaska—The Position of Mount Logan.—In the note entitled "Geographical Work on the North-American Pacific Coast in 1894," which appeared in the February number of this Journal (p. 172), Mount Logan is stated to be situated "about 17 miles north-eastward of St. Elias." Taking the positions assigned by the recent triangulation to these two peaks, and given in the note as being correct, this cannot be the case, and the true distance is found to be 22·6 geog. miles (or 26 stat. miles), while the bearing of Mount Logan from Mount St. Elias is N. 43° 25′ E.

AUSTRALASIA.

Necker Island.—In the last number of the *Journal of the Polynesian Society*, a brief description is given of Necker Island. This little spot, proposed as one of the stations on the contemplated telegraphic cable line from Vancouver to Australia, was taken possession of by the Hawaiian Government on May 27, 1894. The island is situated in the North Pacific Ocean, about 450 miles W.N.W. from Honolulu, in latitude 23° 35′ N., longitude 164° 34′ W. It is a barren lava rock about 260 feet high. An interesting discovery of idols and stone walls, resembling monuments, has recently been made, showing that the island was formerly inhabited, probably by people resembling the cyclopean builders of so many other Polynesian islands.

GENERAL.

The Methods of Geography.—A new publication has lately been started in Germany, under the editorship of Dr. R. Lehmann, which is to deal principally with the methods of geography, both from a scientific and from an educational point of view. It will not be a regular serial, but the parts will come out at indefinite intervals, according as suitable material is forthcoming. The first number opens with a discussion by Dr. A. Kirchhoff of Professor Hirschfeld's proposi-

tions with respect to a modification of the system of geographical education, in which the former deprecates the division of the subject into a physical and an historical-political side, which, though perhaps practicable in the case of general geography, is especially unsuited for the study of the regional branch of the subject, in which the human element cannot be properly studied apart from the physical geography of the environment. The division should rather be, in Dr. Kirchhoff's opinion, between general physical geography and regional geography (*Länderkunde*). The second contribution is a sketch by Dr. W. Ule, of a course of practical work in geography, suitable for the universities; but by far the greater part of the number is taken up with the elaboration by the editor of a plan for the systematic collection of material suitable for the requirements of teachers of *Heimatskunde*. Having pointed out the difficulties which beset the individual teacher in the absence of suitable text-books—those which exist being rather intended for the use of scholars than teachers—Dr. Lehmann suggests that, in the larger centres at any rate, the various educational establishments should co-operate in the collection and arrangement of the material required. He then gives an outline scheme of the various headings under which such material should be arranged, and the particular points which should be kept in view in filling them in; concluding with some remarks on the practical application of the system, and the results likely to ensue from its use. Dr. Lehmann purposes to give from time to time a series of such discussions on the methods of geographical education, which may be regarded as supplementary to his large work on the subject in course of publication.

Prof. Flahault on Botanical Mapping.—Professor Flahault, Director of the Botanical Institute at Montpellier, has undertaken to discuss the botanical geography of France for Engler and Drude's *Vegetation der Erde*. During the past two years he has spent all his spare time in botanizing in the south, and has prepared a map of the distribution of plants for an area equal to one-tenth of the whole country. This is now in the press. In the mean time, Professor Flahault has contributed a note to the Paris Academy of Sciences (*Comptes Rendus*, cxix. p. 1236), in which he discusses some of the difficulties to be overcome in such a work. While it is a simple enough matter to map the distribution of a single species, it is necessary to eliminate much detail in preparing a map of natural regions of vegetation. He finds that he is able to arrive at satisfactory results by mapping the distribution of a judicious selection of plants, which characterise a floral region as precisely as typical fossils do certain geological strata. One other practical difficulty is to eliminate human action in a given region so as to arrive at the natural distribution of spontaneous species. By direct observation, and a knowledge of forestry experiments during the past century, supplemented by archæological and philological evidence, a sufficiently satisfactory solution is attained; the result of which is to persuade Professor Flahault that these spontaneous species are the likeliest to survive, if they have a fair chance. This is a fact of supreme importance in forestry, where it is difficult to decide which species is the best for a given elevation and exposure; and to foresters the new map should be of economic as well as scientific utility.

The Proposed Map of the World on the Scale of One-Millionth.—The Technical Commission of the Geographical Society of the East of France has issued from its head-quarters at Nancy a detailed report on the project of securing the compilation of a complete map of the world on the scale of 1 : 1,000,000, or 16 miles to an inch. After discussing the advantages of the scheme and various objections which have been taken to it, especially with regard to the choice of an

initial meridian and the use of the metric system, the general conclusions come to are approval of the scheme as a whole, subject to a formal agreement of all the Powers concerned, that the metric system be employed for heights, and that the initial meridian be an oceanic one, preferably that of 25° W. from Greenwich. The polyconic or tronconic projection is recommended, and a sea-level datum, and intervals for contouring are suggested. Two editions of the map are proposed, one showing only physical features, and the other complete with ocean routes and means of communication. The official orthography of all names in languages expressed in the Latin alphabet to be retained, and languages in other alphabets to be transliterated by definite rules, without the use of accents or diacritical marks.

Changes in Geographical Publications.—With 1895 the Italian Geographical Society has changed the character of its *Bolletino*, and, following the example of the Paris and Berlin Geographical Societies, has commenced to issue two distinct publications. The *Bolletino* will now contain merely the proceedings of the Society, notes, and bibliography, and will be published monthly. The original papers communicated to the Society will be published in the *Memorie*, which will form an annual volume of about 500 pages, and take the place of the extra volumes formerly published. The popular French weekly, the *Tour du Monde*, has also assumed a new form by incorporating its former supplement, *Nouvelles Géographiques*, and greatly increasing the variety of its contents. Space is given to queries on geographical subjects, and a practical guide to tourists wishing to visit the scenes described in the principal articles is made a special feature.

OBITUARY.

Reginald Thistlethwayte Cocks.

It is with much regret that we record the death of Mr. Reginald T. Cocks, who for twenty-seven years acted as the Society's Treasurer. He was born in 1816, and educated at Westminster School and Christchurch, Oxford. After spending some time in Germany, he entered the bank in 1839, in which he subsequently became a partner. Mr. Cocks became a Fellow of the Society in 1841, and in 1863 succeeded Mr. R. Biddulph as Treasurer. Mr. Cocks's services, which were purely honorary, were of the greatest benefit to the Society, in whose welfare he took a genuine and active interest. Mr. Cocks retired from the firm of Messrs. Cocks, Biddulph & Co. in 1892; he died on January 13 last. He married Miss Stuart, daughter of W. Stuart, Esq., of Aldenham Abbey, Herts., who predeceased him, and leaves surviving an only daughter.

Rev. Alexander Mackay, LL.D.

The Rev. Alexander Mackay, LL.D., author of 'A Manual of Modern Geography' and other text-books, died at Ventnor on January 31, in the eightieth year of his age. Dr. Mackay was a native of Caithness, and a minister of the Free Church of Scotland, but finding the charge of a congregation less congenial than literary work, he early devoted himself to the study of geography and kindred subjects. His books have had a very large circulation, and are characterized by the best qualities of the old school of geographical text-books, being full of facts systematically arranged, scrupulously verified, and illustrated by brief notes of more general interest. In one instance, however, he made an attempt to fasten the elementary facts on the minds of young scholars by producing a 'Rhyming Geography,' some of the stanzas in which, once read, are difficult to forget. Dr. Mackay's most arduous piece of work was an ingenious mnemonic system for remembering numbers, which he developed in a book entitled 'Facts and Dates.'

He also wrote extensively on other subjects. Dr. Mackay's eldest son, inheriting his father's geographical tastes, and having also a remarkable aptitude for engineering, became one of the earliest missionaries to take up residence in Central Africa, and his name, "Mackay of Uganda," occupies an important place in the history of African civilization. Dr. Mackay joined the Royal Geographical Society in 1859.

CORRESPONDENCE.

Kolgueff: Forgotten Visits.

As it is suggested by Mr. Seebohm in the February number of the *Journal* that Messrs. Battye, Powys, and Hyland were probably the first Englishmen to visit Kolgueff, it is only fair to give credit to the old navigators, and recall the visits of Richard Finch and William Gourdon, two hundred and eighty odd years since. As long ago as 1611, Richard Finch, in a letter to Sir Thomas Smith, Governor of the "Worshipfull Companie of English Merchants trading into Russia," wrote as follows: "The seventh of August, William Gourdon and I with our shallop went on shoare. This Colgoiene is a very long and broad Iland with many vallies in it. On the same are many Geese, which the Russes use to take with Nets in the time of the yeere, before they bee ouer fledge. In this Iland seemeth to bee store of Hawkes. Here William Gourdon and our cooper caught two Hawkes, whereof one was spoyled in the taking, the other remayneth aliue."

And William Gourdon himself writes in the same year that "the third [August] at noone we had sight of Colgoiene Iland and tooke the latitude, being on the North side of the island, which was 69 degrees 20 minutes: and at night I went on shoare to see the Land, which was high clay ground: and I came where there was an airie of Slight-falcons: but they did flie all away saue one, which I tooke up, and brought aboord. This Ile of Colgoiene is but thirtie leagues from the Barre of Pechora."

There may be other instances, but these occur to me at once.

ARTHUR MONTEFIORE, F.G.S.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1894-95.

Fifth Ordinary Meeting, January 28, 1895.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

ELECTIONS.—*Major George Newton Barlow, R.A.; Thomas Bland; William Thomas Brand; Rupert Fitzroy Bromley; Alexander Jno. Currie, M.D.; Colonel W. T. Eden (Indian Staff Corps); Newenham A. E. Graydon; Reginald Edward Guise; Lieut. Wm. Albert Harrison, R.E.; William Howat; Rev. Henry Walford Hussey; George Hudson; Captain F. H. Lyell; Dr. Anatolius Markoff; Captain the Hon. H. D. Napier (Indian Staff Corps); John Pemberthy; Richard Phillipps; Lieut.-Colonel William W. Rawes, R.A. (Retired); Rev. Frederick Charles Rogers; H. J. Snow; Rev. Harry de Trevelec; William Francis Wallenstein; John Henry Whadcoat.*

The PRESIDENT said: Before I speak on the subject of the meeting, the Fellows will be glad to hear what progress we have made with the subscriptions for the Geographical Congress. £620 have already been subscribed by the Fellows, making, with the amount already subscribed by the Geographical Society, £1420, which we have to make up to £3500; so we must still work hard in getting subscriptions. On the 22nd we had a technical meeting in the map-room of the Society, when an

address was given us by Prof. Rücker on terrestrial magnetism, which was most successful and most interesting, and led to an equally interesting discussion; and I think we may now consider that these scientific technical meetings have been well established. Both the Fellows present and the whole body of Fellows, I am sure, will thank Prof. Rücker for his great kindness in consenting to give us so interesting an address. I find that a great many Fellows make inquiries about the times when there will be meetings, and other questions. If they will refer to page iv. of the advertisements in the *Journal* each month, they will find all particulars both respecting the meetings and everything else relating to the Society.

The Paper read was:—

"Journeys in South-Western Siam." By H. Warington Smyth.

Sixth Ordinary Meeting, February 11, 1895.—CLEMENTS R. MARKHAM, ESQ., C.B., F.R.S., President, in the Chair.

ELECTIONS.—*Lieut. Henry Butterworth, R.N.R.; Edward North Buxton; Lieut. John Ramsay Craigen, R.N.R.; David Hepburn; Rev. John Magill; Major H. G. Mainwaring; Theodore E. Mavrogordato; Captain Henry Robert F. Plater; Captain John Sparks; Charles Bernard Ward.*

The Papers read were:—

1. "Journeys in North-West British Guiana." By G. G. Dixon.
2. "A Journey in German New Guinea." By Captain Cayley Webster.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By HUGH ROBERT MILL, D.Sc., *Librarian*, R.G.S.

THE following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.	Mag. = Magazine.
Ann. = Annals, Annales, Annalen.	P. = Proceedings.
B. = Bulletin, Bollettino, Boletim.	R. = Royal.
Com. = Commerce, Commercial.	Rev. = Review, Revue, Revista.
C. R. = Comptes Rendus.	S. = Society, Société, Selskab.
Erdk. = Erdkunde.	Sitzb. = Sitzungsbericht.
G. = Geography, Geographie, Geografia.	T. = Transactions.
Ges. = Gesellschaft.	V. = Verein.
I. = Institute, Institution.	Verh. = Verhandlungen.
J. = Journal.	W. = Wissenschaft, and compounds.
M. = Mitteilungen.	Z. = Zeitschrift.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

EUROPE.

Austria—Croatia. *Deutsche Rundschau G.* 17 (1895): 220–224. **Franić.**

Orometrie des Lika-Cacka oder Oberkroatischen Hochlandes und dessen geographische Bestandtheile. Von Professor Karl Franić in Esseg.

Austria—Lake Balaton.

Bericht über die Tätigkeit der Plattensee-Commission der Ung. Geogr. Gesellschaft in den Jahren 1892–93. Separatdruck aus der "Abrégé" der Bull. de la Soc. Hongr. de Geographie Année XXII. Budapest, 1894. Size 9½ × 6½, pp. 44. *Maps, etc.*

The results will be referred to in the Monthly Record.

English Lakes. *J. Geological S.* **51** (1895): 35–48. **Marr.**

The Tarns of Lakeland. By J. E. Marr. *With Maps.*

This paper was briefly noticed in the *Journal* for January, p. 77.

Europe—Industrial. *Deutsche Rundschau G.* **17** (1895): 228–229. **Webersik.**

Die Textilindustrie Europas. Von Gottlieb Webersik. *With Map.*

The map, on the scale of 1 : 15,000,000, shows by appropriate signs the distribution of manufactures of linen, wool, cotton, and silk, with an indication of the relative magnitude of the industries in each town or district.

Europe—Mapping. **Botto.**

Progressi fatti negli ultimi tempi dalla cartografia nei vari Stati di Europa e più specialmente in Italia. Relazione del Ten. Colonnello del genio A. Botto. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Pp. 195–267.

France—Mountain Lakes. *C.R.* **120** (1895): 54–56. **Delebecque.**

Sur quelques lacs des Alpes, de l'Aubrac et des Pyrenées. Note de M. A. Delebecque.

This will be referred to in the Monthly Record.

Germany—Lorraine. **Witte.**

Das Deutsche Sprachgebiet Lothringens und seine Wandelungen von der Feststellung der Sprachgrenze bis zum Ausgang des 16 Jahrhunderts. Von Dr. Hans Witte. Stuttgart: J. Engelhorn, 1894. Size 9½ × 6½, pp. 130. *Map.*

This memoir is part vi. of vol. viii. of Kirchhoff's 'Forschungen zur deutschen Landes- und Volks-kunde.' It is an historical summary of the variations in the German-speaking areas in Lorraine, and the map shows the linguistic boundary for the dates 1000 A.D., 1500, and the present time.

Italy—Earthquakes. **Baratta.**

Sulla distribuzione topografica dei terremoti in Italia durante il quinquennio 1887–91. Saggio di Geografia sismica di Mario Baratta. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Part i. Genoa, 1894. Pp. 180–189. *With Maps.*

Italy—Emilian Region. **Corti.**

Le Provincie d'Italia sotto l'aspetto geografico e storico descritte da Siro Corti. No. 60, Regione Emiliana. Provincia di Parma, pp. 58. No 61, Provincia di Ravenna, pp. 64. No. 62, Provincia di Reggio Emilia, pp. 54. Turin: G. B. Paravia & Co., 1894. Size 8 × 5. *Maps and Illustrations. Price of each No.* 50 *c.*

Italy—Magnetic Survey. **Tacchini.**

Sulle carte magnetiche d'Italia eseguite da Ciro Chistoni e Luigi Palazzo per cura del R. Ufficio Centrale Meteorologico di Roma. Relazione di Pietro Tacchini. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Pp. 149–179. *With Plates.*

Italy—Tides. **Grablovitz.**

Sulle osservazioni mareografiche in Italia e specialmente su quelle fatte ad Ischia, Memoria di Giulio Grablovitz. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Pp. 7–36. *With Plates.*

Montenegro. *Globus* **67** (1895): 111–113. **Hassert.**

Der Name Montenegro. Von Dr. Kurt Hassert. Leipzig.

A discussion of the various theories to account for the name of "Black Mountain" being fastened on the country—whether from dark rocks, dense pine forests now vanished, the dark complexion of the inhabitants, from the name of a ruler, the bad reputation of the mountaineers, or from "Crni Bog"—the black god, or devil, whose home was reputed to be there.

Russia—Northern Lakes. *Globus* **66** (1894): 383–385. **Krahmer.**

Kulikowski's Untersuchungen über das Zuwachsen und das zeitweilige Verschwinden der Seen in dem Gebiete von Onega. Von Generalmajor z. D. Krahmer, Wernigerode.

On the variations of level of the North Russian lakes in the neighbourhood of Lake Onega.

Russia—Novorossiak. *B.S.G. Com. Paris* **17** (1895): 24–43. **Bourge.**

Novorossisk (Georges Bourge). *With Maps.*

A description of Novorossisk, the recently developed Russian seaport on the Black Sea east of the Sea of Azoff, which has now been brought into railway communication with the centre of Russia, and by a line north of the Caucasus with Petrovsk, on the Caspian.

Switzerland—Upper Engadine. **Coolidge.**

La Haute-Engadine et le Bregaglia à travers les siècles. Histoire et Bibliographie par W. A. B. Coolidge. Extrait de *Le Massif de la Bernina* par August Lorria et E. A. Martel, avec la collaboration de Rev. W. A. B. Coolidge et J. Caviezel. Zurich, 1894. Size 12 × 9, pp. 68. *Illustrations. Presented by the Author.*

We understand that this extract is published in advance of the splendidly illustrated quarto of which it will form a part.

ASIA.

Asia-Minor. *Globus* **67** (1895): 101–107, 120–125. **Kannenberg.**

Die "Paphlagonischen" Felsengräber. Von Kannenberg. *With Illustrations.*

Baluchistan. **Holdich.**

Notes on the Antiquities, Ethnography, and History of Las Bela and Makran. By Colonel S. H. Holdich. Calcutta: Office of the Superintendent of Government Printing, India, 1894. Size 13¼ × 8½, pp. 12. *Plate. Presented by the Author.*

Bhutan and Sikkim. **Louis.**

The Gates of Thibet. A bird's-eye view of Independent Sikkhim, British Bhootan and the Dooars as a Doorga Poojah Trip. By J. A. H. Louis. Calcutta: the Catholic Orphan Press, 1894. Size 10 × 6½, pp. 184. *Map and Illustrations. Presented by the Author.*

Mr. Louis has enriched the copy of this most interesting book, which he has presented to the society, with a number of additional photographic illustrations which do not appear in the published edition. We hope to be able to devote an adequate notice to this enterprising trip through the little-known borderlands of India.

Central Asia. *Petermanns M.* **41** (1895): 6–13. **Krahmer.**

Die Expedition der Kaiserl.-russischen Geogr. Gesellschaft nach Mittelasien. Von Krahmer, Generalmajor z. D.

Central Asia. *Globus* **66** (1894): 332–335, 348–351. **Heyfelder.**

O. Heyfelder, Zur Kenntnis der Bevölkerung Bucharas. Mitgeteilt von Dr. H. Obst in Leipzig.

Central Asia—Pamirs. *B.S.G. Italiana* (3) **7** (1894): 635–670, 788–816. **De Rocca.**

Il Pamir e le regioni adiacenti, Relazione di viaggio del Socio cav. Felice De Rocca. *With Sketch-map.*

China. **Mears.**

[Review of] "Society in China" [by Prof. Douglas]. By W. P. Mears. Reprinted from *The Scottish Geographical Magazine* for September, 1894. Size 10 × 6½, pp. 6. *Presented by the Author.*

China—Peking. *J.S. Arts* **43** (1895): 207–221. **Child.**

Peking. By Thomas Child. *With Plan.*

A full and interesting account of Peking, with a plan of the town, and many interesting details regarding the examination system, and the great examination hall of Peking with 15,000 cells for candidates.

Chinese Civilization. **Lacouperie.**

Western Origin of the Early Chinese Civilization from 2300 B.C. to 200 A.D.; or, Chapters on the elements derived from the old civilizations of West Asia in the formation of the ancient Chinese culture. By Terrien de Lacouperie. London: Asher & Co., 1894. Size 10½ × 6½, pp. xiii. and 416. *Price* 21*s.*

This learned work considers the evidence of early influence on China exercised by the Babylonians and Elamites at a very early period, and gives in considerable detail

the records of later intercourse between West and East down to 220 A.D. In conclusion the author finds clear evidence that China presents after all only "an important instance of the general fact gradually disclosed by the process of historical research, that in all investigated cases, culture is the result of an introduction from abroad, and not of a spontaneous development."

Cyprus. *J.R. Colonial I.* **26** (1894–95): 110–125. **Mavrogordato.**

Cyprus and its Resources. By T. E. Mavrogordato.

Dutch East Indies. **Van der Chijs.**

Nederlandsch-Indisch Plakaatboek, 1602–1811. Door Mr. J. A. Van der Chijs. Twaalfde Deel, 1795–1799. 's Hage, M. Nijhoff, 1894. Size 8½ × 5½, pp. 1154.

Eastern Asia. **Curzon.**

Problems of the Far East. By the Hon. George N. Curzon, M.P. Japan—Korea—China. Third edition. London: Longmans & Co., 1894. Size 9 × 6, pp. xx. and 442. *Maps and Illustrations. Price* 21*s.*

This work, although the outcome of the author's extensive travels in Asia, does not profess to be a book of travel, dealing rather with the comparative study of the political, social, and economical conditions of the countries of the Far East. Nevertheless, so far at least as Korea is concerned, the volume contains much new matter which is of great geographical interest, and the author's word-paintings of scenery and cities are admirable examples of geographical description.

India. **Wilson.**

After Five Years in India; or, Life and Work in a Punjaub District. By Anne C. Wilson (A. C. MacLeod). London: Blackie & Son, 1895. Size 8 × 5½, pp. 312. *Illustrations. Price* 6*s. Presented by the Publishers.*

A bright and fresh account of modern life in India, with special reference to the work of the British magistrate. It gives a better idea of the details of administration of the country than most official writings, while it is thoroughly popular in style and aim.

India. **Woodrow and Lawson.**

Records of the Botanical Survey of India, vol. i. No. 4. Notes on a Journey from Haveri to Kumta. By G. Marshall Woodrow. Notes of a Tour in Travancore, etc. By M. A. Lawson. Calcutta, 1894. Size 9½ × 6½, pp. [12].

India—Historical. **Danvers.**

The Portuguese in India, being a History of the Rise and Decline of their Eastern Empire. By Frederick Charles Danvers. 2 vols. London: W. H. Allen & Co., 1894. Size 9 × 6, pp. (vol. i.) liii. and 572; (vol. ii.) xv. and 580. *Maps, Plates, and Portraits. Price* 42*s.*

Further notice will be given of this work.

India—Indus Delta. **Haig.**

The Indus Delta Country. A Memoir chiefly on its Ancient Geography and History. By Major-General M. R. Haig. London: Kegan Paul & Co., 1894. Size 10½ × 6½, pp. 6 and 148. *Maps. Presented by the Author.*

An historical memoir, giving an account of the past geography of the Indus delta as compared with its present condition. It will be separately noticed.

India—Kashmir. **Duthie.**

Records of the Botanical Survey of India, vol. i. No. 3. Report on a Botanical Tour in Kashmir. By J. F. Duthie. Calcutta, 1894. Size 9½ × 6½, pp. [24]. *Map.*

The tour described was made in 1893 from Rawal Pindi to Srinagar, and on to Islamabad, turning north from there to the Sind valley and east to Dras, turning then up the Kishenganga river, and proceeding to the Shersar lake.

India—Lushais. *J.S. Arts* **43** (1895): 167–188. **Shakespear.**

The Lushais and the land they live in. By Captain J. Shakespear. *Map.*

Malay Archipelago—Celebes. *Z. Ges. Erdk. Berlin* **29** (1894): 351–401. **Sarasin.**

Reiseberichte aus Celebes. Von Paul und Fritz Sarasin. Erster Bericht. *With Map.*

Malay Archipelago—Engano. **Modigliani.**

Un Viaggio ad Engano. Conferenza di Elio Modigliani. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. i. Genoa, 1894. Pp. 369–404. *With Map.*

Syria and Arabia. *Palestine Exploration, Q. Statement* (1895): 67–82. **Wright.**

Syria and Arabia. By A. G. Wright.

A study in historical geography, including an account of the formation of the provinces Syria and Arabia by the Romans, and the districts into which they were divided; and of the boundary-lines of Syria and Arabia, and the inscriptions which relate to them.

AFRICA.

Abyssinia. *B.S.G. Italiana* (3) **7** (1894): 841–886. **Cerroti.**

Il secondo viaggio in Abissinia del Mashcov (1891–1892). Versione dalla lingua russa, del socio cap. Ottavio Cerroti.

A translation of Mashkoff's description of his journey in the *Novoia Vremia*.

African Hygiene. **Murray.**

How to live in Tropical Africa: a Guide to Tropical Hygiene. The Malaria problem: the Cause, Prevention, and Cure of Malarial Fevers. By J. Murray, M.D. Maps and Climatological Memoranda by E. G. Ravenstein. London: G. Philip & Son, 1895. Size 7½ × 5½, pp. xii. and 252. *Maps and Illustrations. Price* 5*s. Presented by the Publishers.*

Dr. Murray has utilized his own experience in Africa, and the records of most other students of tropical hygiene, in the compilation of this book, which should prove of the greatest service to explorers and residents in tropical Africa. He dwells at most length on the cause, symptoms, and treatment of malarial fever, which he believes will cease to be a common disease in Africa as it has ceased to be an endemic disease in the English fens, and from the same cause—drainage and the extension of agriculture.

African Native Houses. *Globus* **66** (1894): 341–347, 360–365, 378–383. **Hösel.**

Dr. L. Hösel, Leipzig, Die rechteckigen Schrägdachhütten Mittelafrikas. *With Map and Illustrations.*

An account of the rectangular slope-roofed houses of Central Africa, their architecture and distribution.

British East Africa. **Gregory.**

Contributions to the Physical Geography of British East Africa. By J. W. Gregory. From the *Geographical Journal* for October, November, and December, 1894. Size 10 × 6½, pp. 64. *Map. Presented by the Author.*

British South Africa Company. ——

The British South Africa Company. Directors' Report and Accounts, March 31, 1894. Size 10½ × 8½, pp. 42. *Map.*

British West Africa—Lagos. *Annales G.* **4** (1895): 190–201. **Rouire.**

La Colonie de Lagos, et les Annexions récentes de l'Angleterre. Par Dr. Rouire.

British West Africa—Sierra Leone. **Parkes.**

Elementary Handbook of Geography of the Colony of Sierra Leone and its Hinterland. By J. C. Ernest Parkes. Freetown: printed at T. J. Sawyerr's Excelsior Printing Works, 1894. Size 7½ × 5, pp. 32. *Price* 1*s. Presented by the Author.*

A mass of compact geographical information is presented in this little pamphlet, for the most part in the form of question and answer. It has obviously been compiled with much care, and should prove extremely useful to all who have dealings with the colony.

Central Africa—Uganda. **Ashe.**

Chronicles of Uganda. By the Rev. R. P. Ashe. London: Hodder & Stoughton, 1894. Size 8½ × 6, pp. xiv. and 480. *Portraits and Illustrations. Price* 7*s.* 6*d. Presented by the Publishers.*

No one can write on Uganda with greater authority than Mr. Ashe, and his account of the history of that country from its discovery to the present time is of great value. It is written, of course, from the point of view of the Protestant missionary,

and will be taken in conjunction with other works, by any student who may endeavour to follow in detail the development of East Africa.

Congo Free State. **Reeves.**

Johns Hopkins University Studies. Twelfth Series. XI., XII.—The International Beginnings of the Congo Free State. By Jesse Siddall Reeves, PH.D. Baltimore: The Johns Hopkins Press, 1894. Size 9½ × 6, pp. 106. *Price 50 cents. Presented by the Johns Hopkins University.*

Dr. Reeves has produced a timely study of the origin of the Congo Free State, which supplies in a convenient form most of the facts of interest at the present moment, when the future of the State is under discussion, and the question of its annexation by Belgium in the foreground. There is a full and useful bibliography.

Congo State—Mobangi. *B.S.R. Belge G.* **18** (1894): 944–501. ——

Les rapides du Haut-Oubanghi. *With Maps.*

Contains extracts from M. G. C. Marinel's official reports, and maps of the rapids of Zongo, Belby, Elephants, Banzy, and Cetema, on the Mobangi river.

East Africa. *B.S.G. Italiana* (3) **7** (1894): 816–822. **Sacchi.**

I Fiumi Omo e Baro Secondo una Carta Abissina. Nota del socio Maurizio Sacchi. *With Facsimile.*

Discussion of a map drawn by an Abyssinian, and published in Cecchi's 'Da Zeila alle frontiere del Caffa,' which appears to show that the river Omo has no relation to Lake Rudolf.

Egypt—Nile. *B.S. Khédiv. G.* **4** *S.* (1894): 163–203. **Ventre.**

Les Egyptiens connaissaient-ils la source de leur fleuve? Essai archéologique sur l'origine physique du Nil. Par F. Ventre Bey.

An investigation of the possible data for Ptolemy's assertion that the Nile rose from two large lakes a little beyond the equator on the slopes of the mountains of the Moon. This the author believes to have been a surviving tradition from the period of the XII. and XIII. dynasties, the period of the greatest territorial expansion of the domain of the Pharaohs along the river.

Eritrea. *B.S.G. Italiana* (3) **7** (1894): 774–788. **Ciccodicola.**

Escursione dall' Asmara a Mai Daro attraverso al Deca-Tesfà. Nota del capitano F. Ciccodicola. *Map and Illustrations.*

French West Africa—Dahomey. *Annales G.* **4** (1895): 166–189. **d'Albéca.**

L'avenir du Dahomey. Par M. A. L. d'Albéca. *With Map and Illustrations.*

This study of the future of Dahomey includes an excellent summary of its present state, particularly with regard to people, system of government, and trade. There are several good photographic illustrations.

French West Africa—Gaboon. **Buléon.**

Miss. Catholiques **26** (1894): 586, 596, 607, 619.

Excursion au pays des Eshiras. Par le R. P. Buléon. *With Map and Illustrations.*

German East Africa. **Seidel.**

Das Kisukuma. Grammatische Skizze nebst Kisukuma-Deutschem und Deutsch-Kisukuma Vokabularium. Von A. Seidel. Sonderdruck aus: Zum Victoria Nyanza v. Premierlieutenant W. Werther. Berlin: Gergonne & Co. [not dated, 1894?]. Size 9 × 6½, pp. 18. *Presented by the Author.*

Niger. *Annales G.* **4** (1895): 202–209. **Busson.**

Le régime du Niger. Par M. Henri Busson.

This is a study of the physical geography of the Niger, with regard more particularly to the dates and volumes of its floods.

Somaliland. **Candeo.**

Un viaggio nella penisola dei Somali. Conferenza di Giuseppe Candeo. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. i. Genoa, 1894. Pp. 349–367.

South Africa. *B.S.R. Belge G.* **18** (1894): 526–551. **Leclerc.**

La Golconde africaine. Par J. Leclerc.

A chapter from a forthcoming work, 'A Travers l'Afrique Australe,' describing a visit to Kimberley and the diamond-mines.

NORTH AMERICA.

Canada—Early Discovery. **Dawson.**

The Voyages of the Cabots in 1497 and 1498. With an attempt to determine their Landfall, and to identify their Island of St. John. By Samuel Edward Dawson. From the Transactions of the Royal Society of Canada, vol. xii. sect. ii., 1894. Montreal: W. Foster Brown & Co., 1894. Size 12 × 9, pp. 72. *Presented by the Author.*

A further note on this subject will appear.

Newfoundland and Labrador. *American J. Science* (3) **49** (1895): 86–94. **Wright.**

Observations upon the Glacial Phenomena of Newfoundland, Labrador, and Southern Greenland. By G. Frederick Wright.

The results of these observations will be noticed in the Monthly Record.

United States—Coast and Geodetic Survey. ——

Report of the Superintendent of the U.S. Coast and Geodetic Survey for the fiscal year ending June 30, 1892, in two parts. Part II.—Appendices relating to the Methods, Discussions, and Results of the Coast and Geodetic Survey. Washington: Government Printing Office, 1894. Size 9 × 6, pp. 552. *Maps and Illustrations. Presented by the Survey.*

United States—Massachusetts. **Crosby.**

Geology of the Boston Basin. By William O. Crosby. Vol. i. part ii.—Hingham. (Occasional Papers of the Boston Society of Natural History, IV.) Boston, 1894. Size 10 × 6, [pp. 110]. *Maps. Presented by the Boston Society of Natural History.*

United States—Massachusetts. **Marindin.**

On the changes in the ocean shore-lines of [Nantucket Island, Massachusetts, from a comparison of surveys made in the years 1846 to 1887 and in 1891. A report by Henry L. Marindin. [From the U.S. Coast and Geodetic Survey Report for 1892. Part ii., pp. 243–252. *With plates.*]

An important memoir on coast erosion.

United States—Missouri. *T.A. Science St. Louis* **6** (1894): 481–517. **Updegraff.**

Determinations of the Latitude, Longitude, and Height above sea-level of the Laws Observatory of the University of the State of Missouri, containing a description of the building and principal instruments. By Milton Updegraff. *With Plate.*

SOUTH AMERICA.

Andes—Glaciers. *Globus* **67** (1895): 37–38. **Hauthal.**

Gletscherstudien aus der argentinischen Kordillere. Von Dr. Rudolf Hauthal.

Dr. Hauthal, the director of the geological section of the La Plata Museum, here gives notes of the glacial observations made on his geological survey of a portion of the Argentine Cordillera, between February and August, 1894.

Brazil—Amazons. **Leal.**

O Amazonas. Conferencia realisada na Sociedade de Geographia de Lisboa em 9 de Novembro de 1894. Pelo Dr. Oscár Leal. Lisbon, 1894. Size 7½ × 5½, pp. 66. *Presented by the Author.*

Brazil—Ceará. *Globus* **67** (1895): 33–35. **Ihering.**

Ceará und die Pläne zur Verbesserung seines Klimas. Von Dr. H. v. Ihering. S. Paulo.

Chile. *M.G. Ges. Wien* **37** (1894): 503–544. **Polakowsky.**

Die Entwicklung der Republiken Chile und Argentinien in den Jahren 1889 bis 1894. II. Chile. Von Dr. H. Polakowsky.

Ecuador. *Deutsche G. Blätter* **17** (1894): 265–289. **Eggers.**

Das Küstengebiet von Ecuador. Von Baron H. Eggers. *With Map.*

The map shows the annual isotherms, and distinguishes the arid regions from the regions of the Garuas, where rain falls.

Guatemala. **Sapper.**

Grundzüge der physikalischen Geographie von Guatemala. Von Dr. Carl Sapper. *With four Maps.* Gotha: Justus Perthes. Size 11 × 7½, pp. iv. and 60. *Price* 6 *m.* 40 *pf.*

The principal maps accompanying this memoir (Ergänzungsheft No. 113 of 'Petermann's Mitteilungen') are a fine contoured sheet on the scale of 1 : 900,000, showing the complete orography of Guatemala in colours, a geological map, and a vegetation map on the same scale. The memoir itself is a good example of the thorough systematic study of the physical geography of a whole country.

Paraguay. *Norske G.S. Aarbog* 5 (1893–1894): 25–27. **Storm.**

Reiser og opdagelser paa Pilcomayo-floden, af løitnant O. J. Storm. *With Map and Illustrations.*

Peru. *Deutsche Rundschau G.* 17 (1895): 145–155, 203–213. **Hübner.**

Vom Amazonenstrom nach der peruanischen Westküste. Von Georg Hübner in Manaos. *With Illustrations.*

AUSTRALASIA AND PACIFIC ISLANDS.

Marshall Islands—Jaluit. *M. Deutsch. Schutzgeb.* 7 (1894): 305–318. **Steinbach.**

Bemerkungen über das Klima von Jaluit. Nach Dr. Steinbach.

The observations on which this report is founded were made from December 1891 to June 1894.

New Caledonia. ——

Publications de l'Union Coloniale Française. Guide de l'Emigrant en Nouvelle-Calédonie. Paris: A. Challamel, 1894. Size 7½ × 5, pp. 124. *Map. Presented by the Union Coloniale Française.*

A pamphlet prepared in the hope of turning the current of French emigration from the South American republics to New Caledonia.

New Hebrides. **Beaune.**

La Terre Australe Inconnue. Onze croisières aux Nouvelles-Hébrides. Par Gaston Beaune. Lyon: Delhomme et Brignet [not dated, 1894]. Size 7½ by 5, pp. 300. *Map and Illustrations.*

M. Gaston Beaune is a young French naval officer who has made good use of his opportunities in visiting various islands of the New Hebrides, and gives also a connected account of the history and present conditions of the group.

New Zealand—Year-Book. **Dadelszen.**

The New Zealand Official Year-Book, 1894. . . . By E. J. von Dadelszen. Wellington, 1894. Size 8½ × 5½, pp. vi. and 567. *Maps and Diagrams.*

The present edition, in addition to the usual official statements and statistics, contains a number of special articles on the land-system of the colony, agriculture, mining, climate, alpine exploration, etc.

Solomon Islands. *Globus* 67 (1895): 6–12. **Seidel.**

Die natürlichen Kanäle auf den Salomo-Inseln. Von H. Seidel, Berlin. *With Maps.*

Maps and descriptions, compiled from the works of several travellers, of the narrow channels separating some of the members of the Solomon Islands.

POLAR REGIONS.

Antarctic. *Norske G.S. Aarbog* 5 (1893–1894): 115–131. **Larsen.**

Nogle optegnelser af sæl og hvalfanger "Jasons" reise i Sydishavet 1893 og 94, af Kapt. C. A. Larsen. *With Map.*

An abstract of Captain Larsen's log with map of his antarctic cruise is given in the *Journal* for 1894, vol. iv. p. 333.

Antarctic Researches. **Roncagle.**

Studio preliminare per una Stazione Geografica Italiana nelle regioni polari antartiche. Presentato al primo Congresso Geografico Italiano in Genova dal Tenente di vascello della Ris. Nav. Giovanni Roncagle. Atti del Primo Congresso Geografico Italiano tenuto in Genova, 1892. Vol. ii. part i. Genoa, 1894. Pp. 129–148.

Greenland. *J. of Geology* **2** (1894): 649–666. **Chamberlin.**

Glacial Studies in Greenland. By T. C. Chamberlin. *With Illustrations.*

This is the first of a series of articles on the glacial conditions of Greenland which Professor Chamberlin is to contribute to the *Journal of Geology*, describing the results of his last summer's voyage to the coast of Greenland.

Greenland. *G. Tidskrift* **12** (1893–94): 247–255. **Holm.**

Oprettelsen af Missions- og Handelsstationen Angmagsalik paa Grønlands Østkyst. Ved J. Holm, Kaptain i Flaaden. *With Map.*

A visit to the Danish stations on the east coast of Greenland.

NEW MAPS.

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EUROPE.

England and Wales. **Ordnance Survey.**

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Town Plans—5-feet scale :—

London (Revision), VI. 79, with houses stippled, 2*s.* 6*d.* each.

——— 10-feet scale :—

London—Re-survey (Hornsey Parish), III. 45, 1, 3; III. 55, 3; III. 65, 2, 2*s.* 6*d.* each. Index 6*d.*

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Germany. **Lepsius.**

Geologische Karte des Deutschen Reichs, auf Grund der unter Dr. C. Vogels Redaktion in Justus Perthes' Geograph. Anstalt ausgeführten Karte in 27 Blättern bearbeitet von Dr. Richard Lepsius. Scale 1 : 500,000 or 7·6 stat. miles to an inch. Lieferung III. Sheets:—26, Augsburg; 27, München. Justus Perthes, Gotha, 1895. *Price* 3 *marks each part.*

The geological map of Germany is based on the topographical map in 27 sheets, by Dr. C. Vogel, and published by Justus Perthes of Gotha in 1891–93. It is, in fact, that map geologically coloured under the direction of Dr. Richard Lepsius. The colours are carefully chosen, and register well.

Germany. **German Government.**

Karte des Deutschen Reiches. Scale 1 : 100,000 or 1·51 stat. miles to an inch. Sheets:—140, Norden; 172, Emden; 188, Stargard i. Pom; 411, Muhlhausen i. Thrgn; 437, Gotha; 438, Erfurt. Herausgegeben von der Kartogr. Abtheilung der Königl. Preuss. Landes Aufnahme, 1894. *Price* 1·50 *mark each sheet.*

Switzerland. **Swiss Federal Staff.**

Topographischer Atlas der Schweiz im Massstab der Original-Aufnahmen, nach dem Bundesgesetze vom 18 Dezember 1868 durch das eidg.

topogr. Büreau gemäss den direktionen von Oberst Siegfried veröffentlicht. Scales 1 : 25,000 or 2·5 inches to a stat. mile, and 1 : 50,000 or 1·25 inches to a stat. mile. XLIII. Lieferung. Sheets:—209, Lowerz; 296, Thierrens; 308, Cassonay; 376, Pilatus; 386, Flühli; 387, Sörenberg; 388, Giswilerstock; 442, St. Cergue; 444, Crassier; 471, Tornettaz; 545, Mendrisio; 547, Chiasso. XLIV. Lieferung. Sheets:—262, Hinter Wäggithal; 283, Saint-Croix; 289, Bel Coster; 297 bis, Les Mines; 298, Le Brassus; 299, Le Sentier; 381, Brunnen; 431, Marchairuz; 538, Taverne; 544, Porto Ceresio; 546, Varese; 548, Val della Grotta. *Price* 1 *fr. per sheet. Presented by the Topographical Bureau, Swiss Federal Staff.*

ASIA.

India. **The 'Indian Engineer.'**

The *Indian Engineer* map of India, showing railways, canals, irrigation-works, rivers, etc. Published at the office of the *Indian Engineer* in Calcutta and London. Scale 1 : 1,900,800 or 30 stat. miles to an inch. Four sheets. *Price* 2*l.* 2*s.* unmounted, 3*l.* 3*s.* mounted. *Presented by Ernest Benedict, Esq., M. Inst. C.E., editor of the 'Indian Engineer.'*

This is a large wall-map of India, showing, in a remarkably clear manner, by different symbols, all the railways at present working, and those under construction and proposed, together with the gauges of the lines. Main roads and navigable rivers are indicated, the former being coloured yellow, and the latter blue. No hill-shading is given, and the map contains only the names of the more important places.

Nicaria Island. **Büchner.**

Die Insel Nikaria. Nach der Englischen Admiralitätskarte, mit Nachträgen und Verbesserungen von Dr. L. Büchner, 1892. Scale 1 : 150,000 or 2·4 stat. miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1894, Tafel 18. Gotha: Justus Perthes, 1894. *Presented by the Publisher.*

AFRICA.

East Africa. **Fischer.**

Karte der Gebiete von deutsch- und britisch-Ost-Afrika zwischen dem Victoria-Nyansa und dem Kenia. Mit Benutzung der Routen-Aufnahme Dr. G. A. Fischer's, nach dem neuesten Quellen gezeichnet von Dr. Bruno Hassenstein. Scale 1 : 750,000 or 12 stat. miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1895, Tafel 1. Gotha: Justus Perthes, 1895. *Presented by the Publisher.*

South Africa. **Donald Currie & Co.**

The Castle Line Atlas of South Africa. A series of 16 plates, printed in colours, containing 30 maps and diagrams. With an account of the geographical features, the climate, the mineral, and other resources, and the history of South Africa, and an Index of over 6000 names. London: Donald Currie & Co., 1895. *Price* 3*s.* 6*d. Presented by Messrs. Donald Currie & Co.*

To all who are interested in South Africa this will doubtless prove a very useful little atlas. The maps, which are prepared by Messrs. G. Philip & Son, are carefully brought up to date; and, in addition to those showing the general geographical features and political boundaries, there are others giving the location of the minerals and agricultural products, means of communication and mission stations, relief shown by shaded contours, the geology, rainfall, and ethnology. Enlarged plans are given, as insets, of the principal towns and gold-fields, and at the end there is a map of East Central Africa, including British Central Africa and Nyasaland.

The forty-seven pages of letterpress which precede the maps, contain a great deal of useful information for emigrants, sportsmen, and others who may be thinking of visiting South Africa. There is also a page, at the commencement of the atlas, giving a short description of the South African railways.

GENERAL.

German Colonies. **Langhans.**

Deutscher Colonial-Atlas, 30 Karten mit vielen hundert Nebenkarten, entworfen, bearbeitet und herausgegeben von Paul Langhans. Achte Lieferung Gotha: Justes Perthes, 1895. *Price* 1 *mark* 60 *pf. each part.*

This part contains maps Nos. 16 and 23 of the atlas, the former being the second sheet of a four-sheet map of German South-West Africa, and the latter a map of Australasia and Polynesia, showing the German possessions and settlements. In addition to the principal maps, various insets on enlarged scales are given.

World. **Kirchhoff and Herrich.**

Wandkarte des Weltverkehrs, Äquatorial-Massstab, 1 : 22,000,000 or 5° to an inch. Mit 4 Nebenkarten : Central-Amerika, Massstab 1 : 11,000,000 ; Nordsee und Kanal, Strasse von Suez und Strasse von Malakka, Massstab 1 : 4,400,000. Bearbeitet und Herrn Professor Dr. Alfred Kirchhoff gewidmet von A. Herrich. Glogau, Druck und Verlag von Carl Flemming, 1895. 4 sheets. *Price* 12 *marks.*

All the principal railways, steamship tracks, submarine and overland telegraph lines, navigable rivers and canals are clearly shown on this map, as well as political divisions, German consular stations, and other useful information. It is printed in colours in a bold style, and, as a general commercial wall map of the world, will doubtless be of service to many.

World. **Miller.**

Mappaemundi. Die ältesten Weltkarten, herausgegeben und erläutert von Dr. Konrad Miller. 1 Heft :—Die Weltkarte des Beatus (776 n. Chr.). Jos. Roth'sche Verlagshandlung Stuttgart, 1895. *Price* 5*s. each part.*

This is the first of a series of facsimile maps, of which others will follow in due course. It is printed in colours, and accompanied by full explanatory letterpress. According to a prospectus issued with this map, the following are the titles of those yet to appear :—

Heft 2.—Atlas von 16 Lichtdrucktafeln, ohne Text, enthaltend : 1, Die Psalterkarte von London ; 2, Beatuskarte von Paris II. ; 3, Beatuskarte von Osma ; 4, Beatuskarte von Ashburnham ; 5, Beatuskarte von Valladolid ; 6, Beatuskarte von Madrid ; 7, Beatuskarte von London ; 8, Beatuskarte von Gerona ; 9, Beatuskarte von Turin ; 10, Beatuskarte von Paris III. ; 11, (1) Karte des hl. Hieronymus ; 12, (2) Karte des hl. Hieronymus ; 13, Karte des Heinrich von Mainz ; 14, Die Cottoniana ; 15, 16, Karten des Ranulf Hygden. *Heft* 3.—Die kleineren Weltkarten : des hl. Hieronymus ; des Heinrich von Mainz ; die Cottoniana ; die Psalterkarte ; die Karte des Lambert von St. Omer ; des Matthäus Parisius ; des Ranulf Hygden ; des Guido ; die Sallustkarten und viele kleinere. *Heft* 4.—Die Herefordkarte. *Heft* 5.—Rekonstruierte Karten des 7, bis 1, Jahrhunderts n. Chr. : 1, Die Weltkarte des Ravennaten ; 2, Die Weltkarte des Isidor von Sevilla ; 3, Die Weltkarte des Orosius ; 4, Sphaera Julii Honorii ; 5, Die Fragmente des Romanus von Ammianus Marcellinus ; 6, Das 1 Segment der Castorius-Karte ; 7, Der Pinax Dionysii ; 8, Die Weltkarte des Pomponius Mela ; 9, Dimensuratio und Divisio.

When complete, these will doubtless form a most important series of reproductions, especially interesting to students of historical geography.

CHARTS.

Chile. **Oficina Hidrográfica, Chile.**

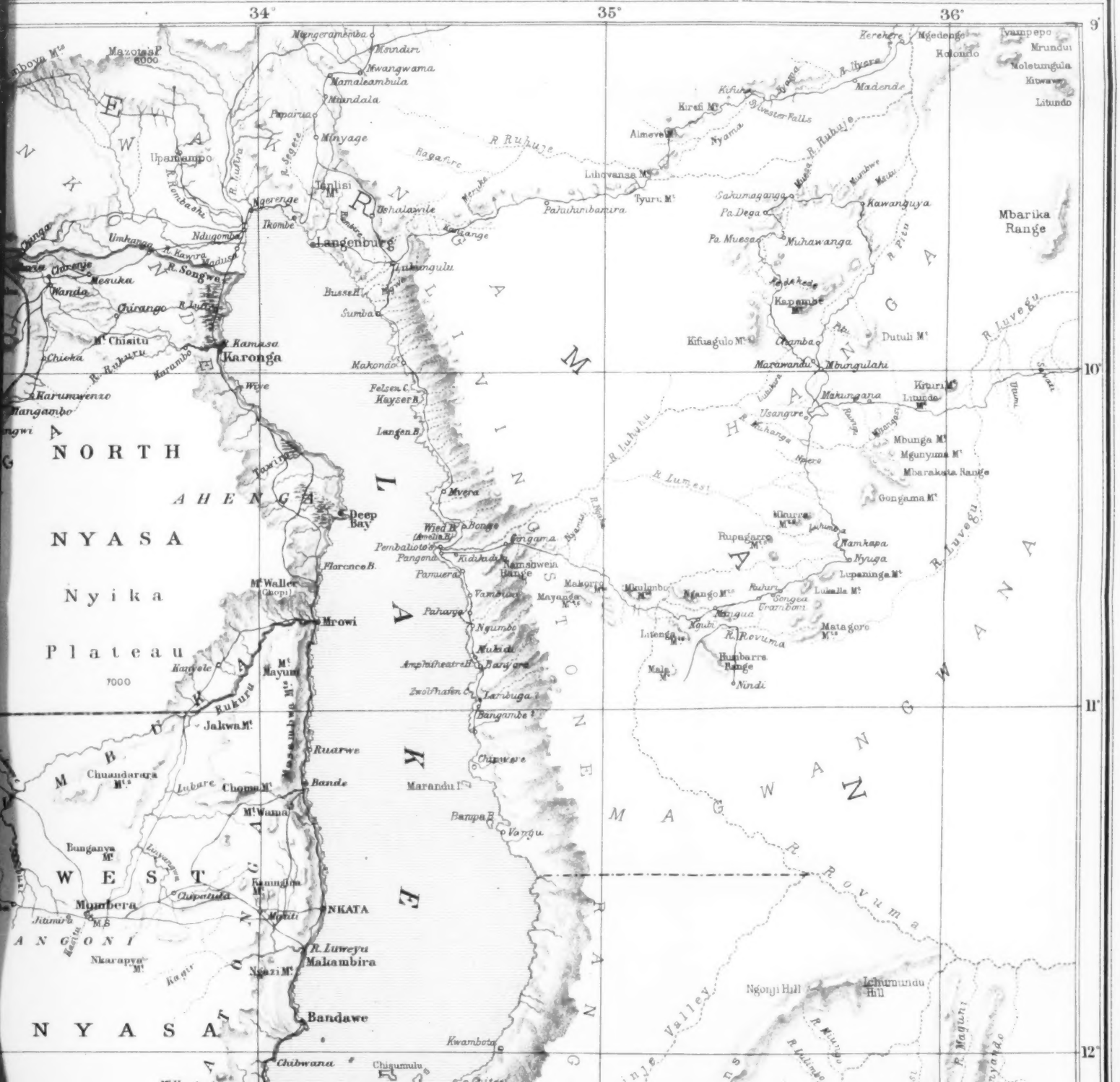
No. 48. Planos de la Costa de Chile : Ensenada Tames, 1 : 20,000. Caleta Lantaro, 1 : 10,000, 1894.—No. 49, Costas de Chile : Isla Mocha, 1 : 40,000. 1894. *Presented by the Chilian Hydrographic Office.*

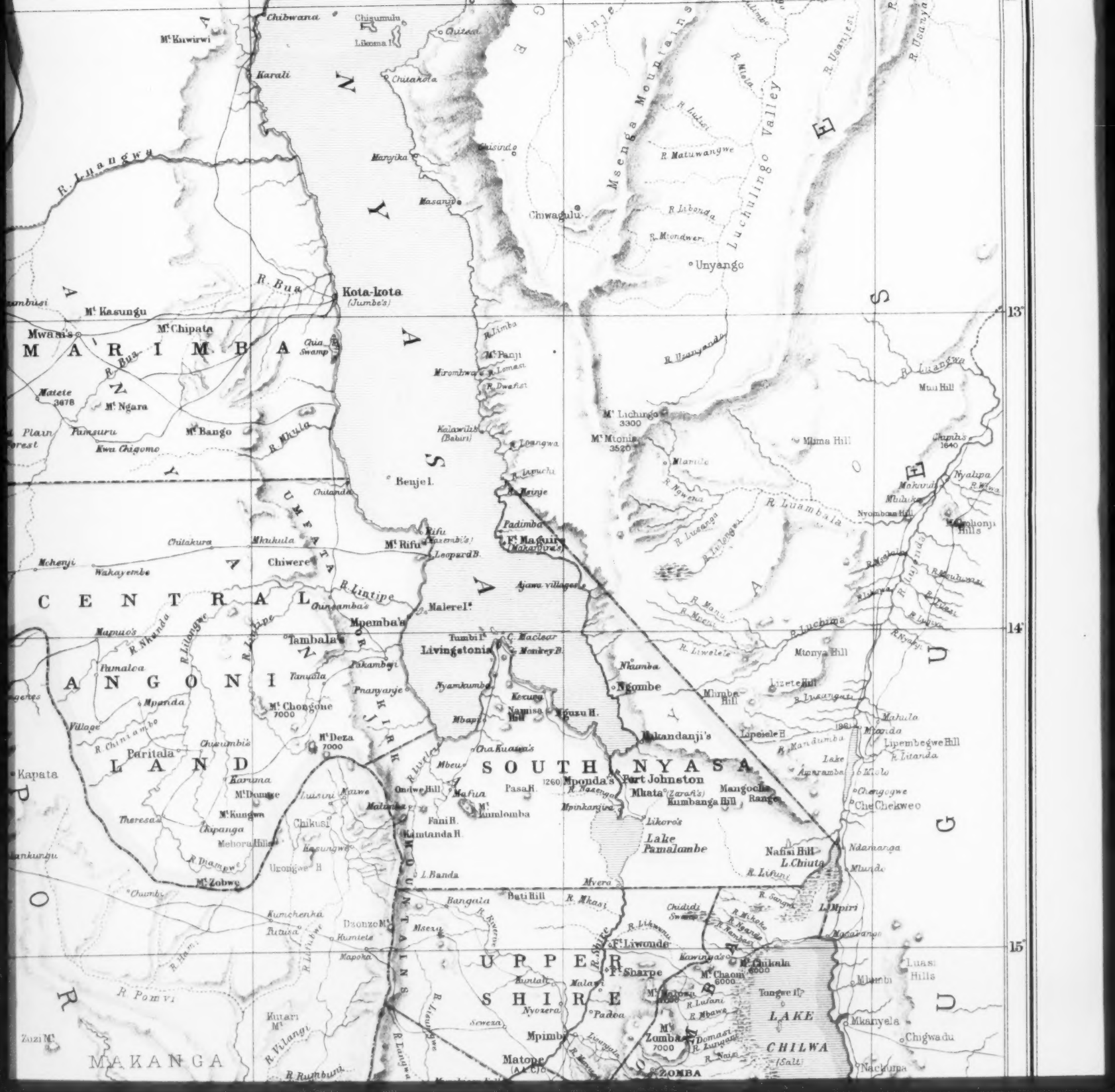
North Pacific Ocean. **U.S. Hydrographic Office.**

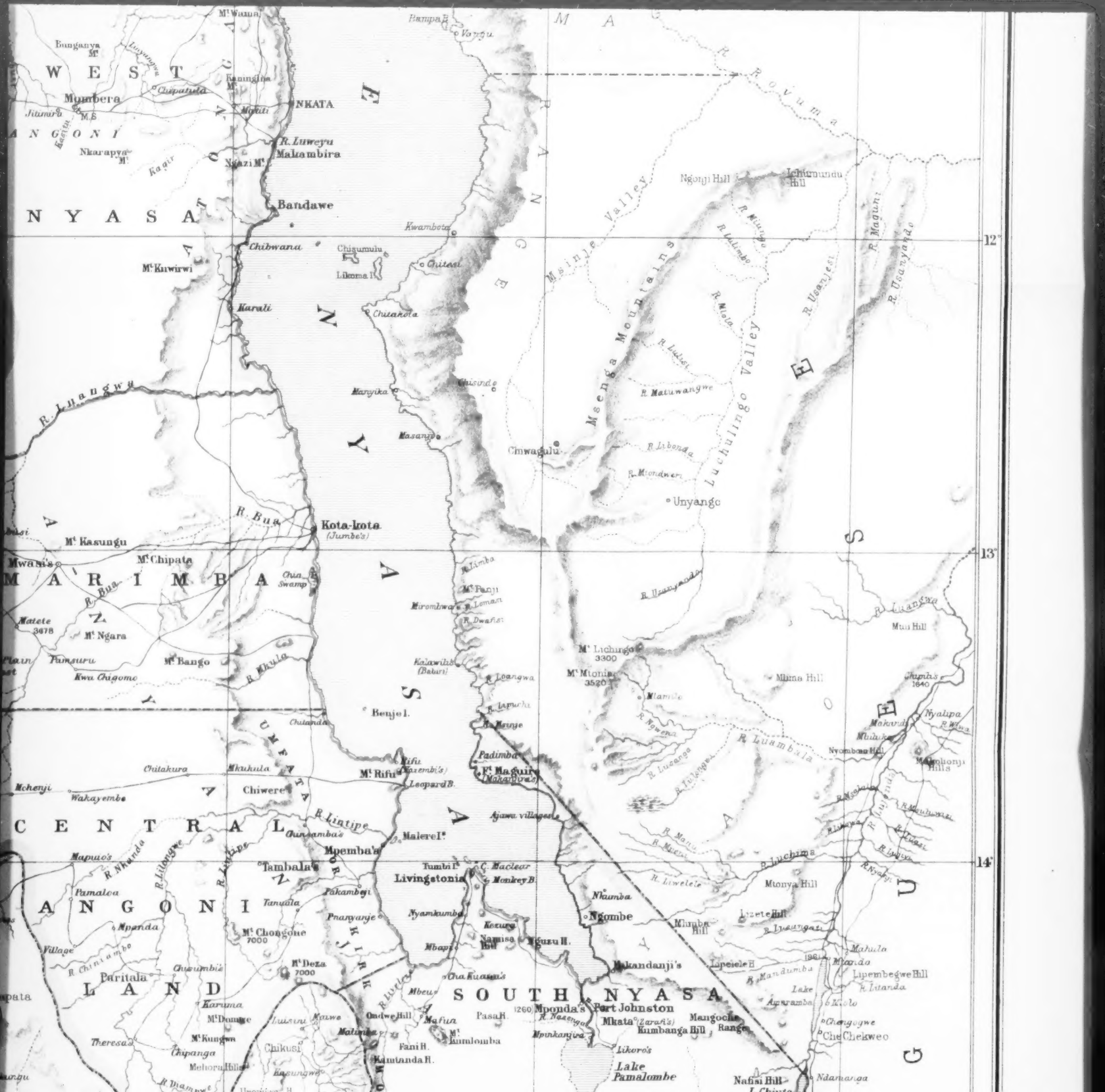
Pilot Chart of the North Pacific Ocean. February, 1895. Published at the Hydrographic Office, Bureau of Navigation, Navy Department, Washington, D.C. Charles D. Sigsbee, Commander, United States Navy, Hydrographer. *Presented by the U.S. Hydrographic Office.*

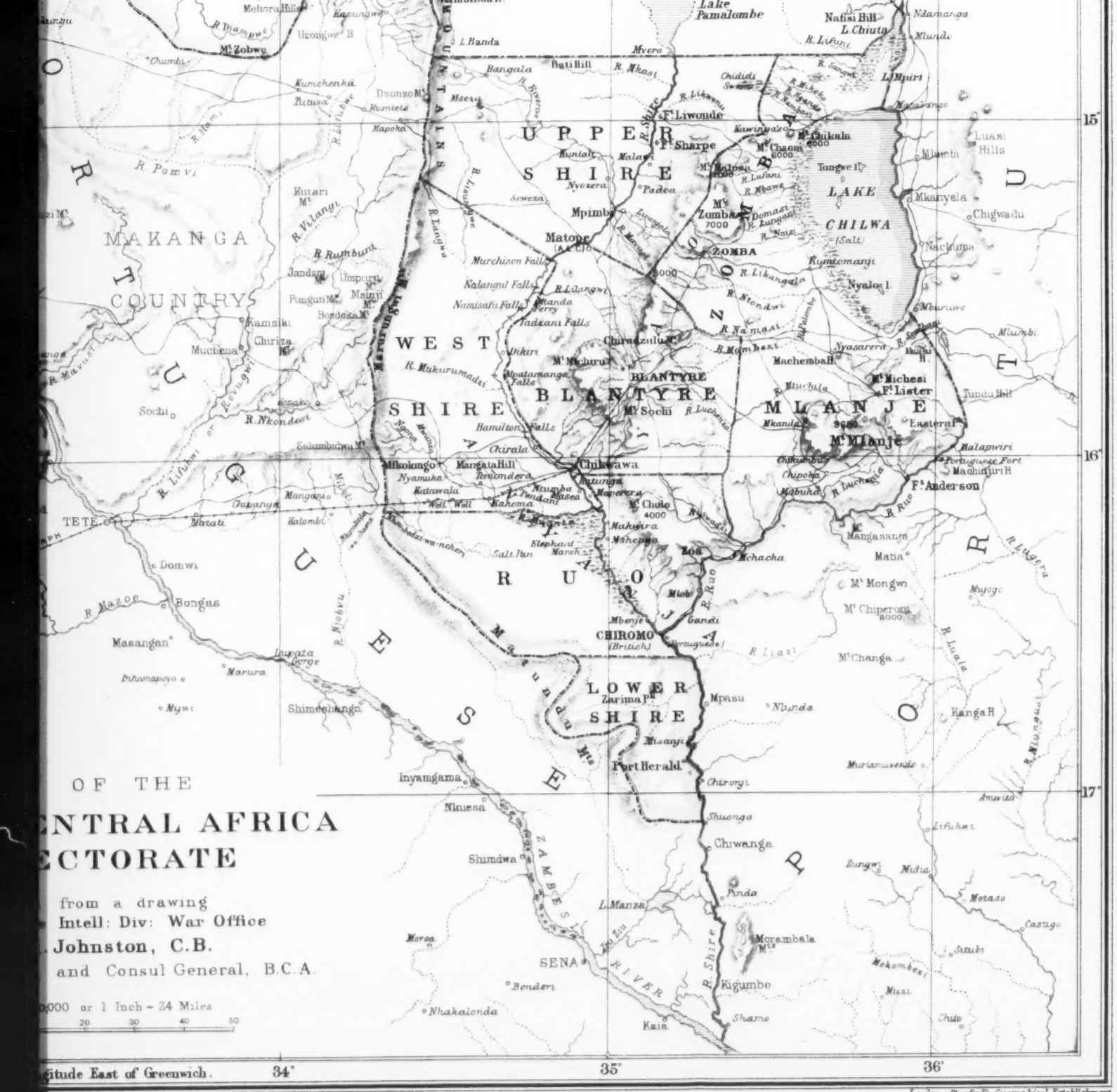
PHOTOGRAPHS.

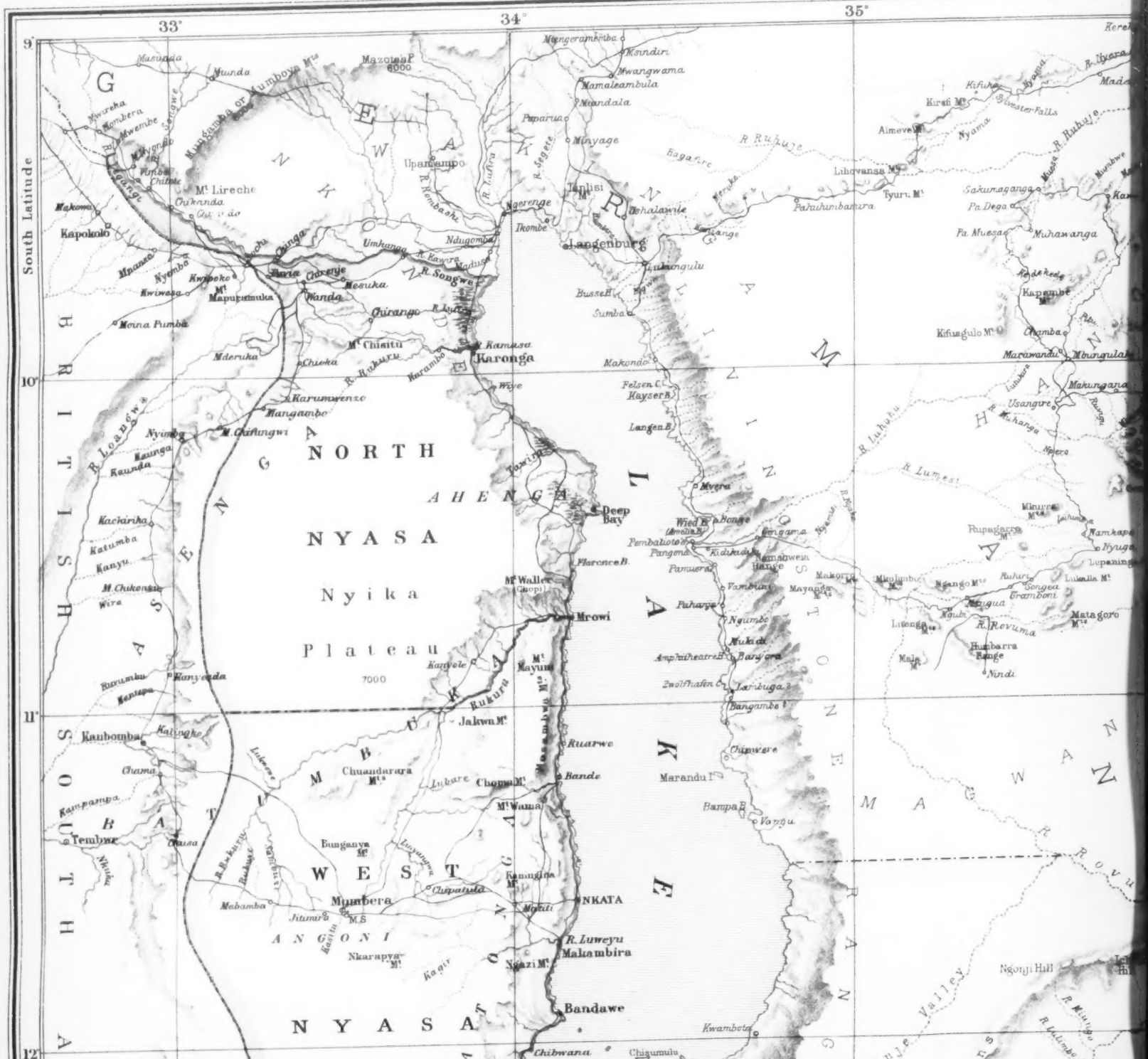
N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.


34°
35°
36°
9°
10°
11°
12°
NORTH
NYASA
Nyika
Plateau
7000
NYASA
WEST
NYASA
Karonga
Deep Bay
Mrowi
NKATA
Bandawe
Langenburg
Mt Waller
Mt Chisitu
Mt Mayum
Mt Wama
Mumbera
Jakwa Mt
Chuandarura Mts
Choma Mt
Banganya Mt
Nkarapya Mt
Ngazi Mt
Kamungira Mt
Mbarika Range
Mbunga Mts
Mgunyuma Mt
Mbarakata Range
Gongama Mt
Rupagarro Mts
Namkapa
Nyuga
Lupaninga Mt
Matagoro Mts
Humbarra Range
Nindi
Kapambe Mt
Dutuli Mt
Kifusagulo Mts
Kituri Mt
Litundo Mt
Almeva Mt
Kirefi Mt
Lihovanse Mts
Tyuru Mt
Mango Mts
Mikulumbu Mt
Ngoniji Hill
Ichumundu Hill
Chibwana
Chigumulu
Kwambota
Marandu I.
Ruarwe
Bande
Chiwere
Vanyu
Ngumbe
Nukidi
Baryera
Larubuga
Bangambe
Paharge
Vamisuri
Mayanga
Pangena
Kidukadu
Ramshwein Range
Pamuera
Pembalototo
Wied R.
Amelia R.
Bonga
Florence B.
Myera
Langen B.
Felsen C.
Kayser B.
Wiye
Makonde
Busse R.
Sumba
Ukhalawile
Ngerenge
Ikombe
Tonlisi Mt
Minyage
Paparua
Mwangwama
Mamaleambula
Mwandala
Mangerambula
Mondiri
Kerehere
Mgedenge
Kolondo
Madende
Kifuka
Kirefi Mt
Almeva Mt
Nyama
Sakumaganga
Pa Dega
Pa Muesa
Muhawanga
Kawanguya
Kapambe Mt
Kifusagulo Mts
Dutuli Mt
Mbungulahi
Marawandu
Makungana
Usangire
Kituri Mt
Litundo Mt
Mbunga Mts
Mgunyuma Mt
Mbarakata Range
Gongama Mt
Rupagarro Mts
Namkapa
Nyuga
Lupaninga Mt
Matagoro Mts
Humbarra Range
Nindi
Mikulumbu Mt
Mango Mts
Ngoniji Hill
Ichumundu Hill
Tyuru Mt
Lihovanse Mts
Kawanguya
Muhawanga
Pa Muesa
Pa Dega
Sakumaganga
Mbungulahi
Marawandu
Kapambe Mt
Dutuli Mt
Kifusagulo Mts
Kituri Mt
Litundo Mt
Almeva Mt
Kirefi Mt
Nyama
Madende
Kolondo
Kerehere
Mgedenge
Ivampepo
Mrundui
Moletungula
Kibwaya
Litundo
R. Ruhuje
R. Ruvuma
R. Luvegu
R. Lumesi
R. Lukuru
R. Rukuru
R. Songwe
R. Kamasa
R. Lufira
R. Kayura
R. Segere
R. Mufira
R. Lunyangwa
R. Kasitu
R. Mpiru
R. Mtitu
R. Mtitumbe
R. Mtitumbe
R. Kiuru
R. Kiuru
R. Kiuru


Chibwana
Chisumulu I.
Liteoma I.
Mt. Kawirwi
Karali
Quizea
Chitakola
Marzika
Kasanjo
Chisindo
Chiwagulu
Unyango
Msenga Mountains
Luchulingo Valley
R. Luangwa
R. Bua
Kota-kota
(Jumbe's)
Mt. Kasungu
Mwasi's
Mt. Chipata
MARIMBA
Chia Swamp
Matete 3678
Mt. Ngara
Plain
Tumsuru
Mt. Bango
Kwa Chigomo
R. Mkula
Benje I.
Chitanda
Kalawilila (Babiri)
Mirombwa
Mt. Panji
Mt. Lichungo 3300
Mt. Mtonia 3520
Mlima Hill
Mlanda
Mtai Hill
Chipata 1640
Nyalupa
Mkanda
Mtuluka
Nyombwa Hill
Mchonja Hills
Padimba
Ft. Maguire (Makanjira's)
Mt. Rifu (Kasembi's)
Leopard B.
Chitakura
Mkukula
Mchenji
Wakayembe
Chiwere
CENTRAL ANGONI LAND
Chuncamba's
Malere I.
Mpemba's
Tambala's
Livingstonia
Tumbi I.
C. Maclear
Monkey B.
Nyamkumbo
Kacuna
Namisa Hill
Mt. Chongone 7000
Mt. Deza 7000
Paritala
Kapata
Karuma
Mt. Dombe
Mt. Kungwa
Theresa
Ukpanga
Mehora Hills
Mt. Zobwe
Chikusi
Kasungwe
Ntaswi
Ondwe Hill
Mafua
Pasa H.
Mt. Zumlomba
Fani H.
Kamtanda H.
Mbeus
Mpinkanjira
Mponda's
Port Johnston
Mkata (Zarafi's)
Kumbanga Hill
Mangochi Range
Likoro's
Lake Pamalambe
Nafisi Hill
L. Chiuta
Ndamanga
Mtunda
Chingoswe
Chekweo
Lipembegwe Hill
Lake Amaramba
Mkandanji's
Lipoiele H.
Mtonya Hill
Mimba Hill
Lizete Hill
Mahula
Mtanda
Nkumba
Ngombe
Ajawa villages
Mbame
Mbapa
Ngusu H.
SOUTH NYASA
Mbeus
Ora Kuasa's
Mt. Mlanje 9850
Mt. Zomba 7000
Chingale
Mt. Chiradzulu 6000
Mt. Chaoni 6000
Mt. Malosa
Tongwe H.
Mt. Zomba
Domasi
Matope (A.A.C.)
Mpimbi
Nyozera
Padoa
Malaka
Kuntali
Mwera
Bati Hill
Bangala
Chididi Swamp
Kawinga's
Ft. Liwonde
Ft. Sharpe
Ft. Lugard
Mt. Chikala 6000
Mt. Mlanje
Luasi Hills
Mlimbi
Mkanyela
Chigwadu
Nachuma
LAKE CHILWA
(Salt)
ZOMBA
MAKANGA
Zuzi Mt.
Kutari Mt.
Dzonzo Mt.
Kumchenha
Rutusa
Kumtete
Mapoka
Mseru
Chumbi
Ukonigwe H.
L. Banda
Mt. Zobwe
R. Pomvi
R. Vilangi
R. Rumbuni
R. Diampwe
R. Lintipe
R. Lilongwe
R. Nkhunda
R. Chinambo
R. Lurio
R. Mkasi
R. Shire
R. Lisunu
R. Mbawe
R. Lufani
R. Lungwa
R. Domasi
R. Naisi
R. Mbiloka
R. Ngana
R. Sangwi
R. Mpiri
R. Lifuni
R. Luchima
R. Luambala
R. Mtiwa
R. Mkuwazi
R. Mtiwasi
R. Mtiwa
R. Mtiwasi
R. Mtiwa
R. Mtiwasi
R. Mtiwa


WEST
NYASA
ANGONI
LAND
MARIMBA
CENTRAL
SOUTH NYASA
UNGU
Mumbera
Nkata
Bandawe
Kota-kota
(Jumbe's)
Mwase's
Mt Kasungu
Mt Chipata
Mt Ngara
Mt Bango
Mt Chongone
7000
Mt Deza
7000
Mt Rifu
Mt Panji
Mt Lichinga
3300
Mt Mtonia
3520
Mt Waller
Mt Kiwirwi
Mt Kasirwi
Mt Ngoni
Mt Mlanje
9843
Mt Zomba
7000
Mt Chiradzulu
Mt Michesi
Mt Mlosa
Mt Mpingwe
Mt Mpingwe
Mt Mpingwe


UPPER SHIRE
LAKE CHILWA
CHILWA
ZOMBA
BLANTYRE
SHIRE HIGHLANDS
MLANJE
WEST COAST
LOWER SHIRE
MAKANGA COUNTRY
ZAMBESI RIVER
SENA
CHIROMO
Port Herald
Blantyre
Zomba
Matope
Mpimbi
Chikwawa
Nsanje
Lake Pamalombe
L. Banda
L. Chiuta
L. Mpiri
L. Chilwa
Mt. Zobwe
Mt. Zomba 7000
Mt. Mlanje 9000
Mt. Chaom 6000
Mt. Malosa 6000
Mt. Michesi
Mt. Sochi
Mt. Michuru
Mt. Chiperone 6000
Mt. Mongwi
Mt. Mangasana
Mt. Chiradzulu
Mt. Chiromo 4000
Fort Liwonde
Fort Sharpe
Fort Chikala
Fort Lister
Fort Anderson
Tungwe I.
Nyalo I.
Tundu Hill
Easterut
Mkanyela
Chigwadu
Nachuma
Luasi Hills
Milanje
Mbuluwe
Miumbi
Nyasarera
Machemba H.
Rymomanji
Matope (A.F.C.)
Malosa
Padoa
Nyozera
Mpimbi
Sweza
Kuntali
Malosa
Kawinga's
Chididi
Swamp
Myera
Mkasi
Batti Hill
Hangala
Maeru
Mapoka
Kumtela
Dzonzo Mt.
Kumchenka
Rutusa
Mchoma
Ndamanga
Mlunda
Nafisi Hill
Lifuni
Sangwi
Mbeka
Mgunga
Namkaya
Mkalanga
Chimbi
Mchoma
Uronguwe H.
Kasungwe
Diampwe
Melora Hill
Kutari
Vilangi
Rumbura
Jandam
Umpuru
Mpungu
Msinji
Bondeka
Kamsisi
Chiriza
Muchena
Sochi
Nkondezi
Mavuzi
Berugwi
Lifubwi or Berugwi
Salumbidwa Mt.
Mikolongo
Mangata Hill
Nyamuka
Tomondera
Katawala
Well Well
Mahoma
Ntumba
Masea
Pendani
Chirala
Hamilton Falls
Ngona
Mwanza
Mukurumadzi
Upatamanga Falls
Vikiri
Nadzani Falls
Namisafu Falls
Nanda Ferry
Lilangwi
Nalangui Falls
Murchison Falls
Lengwe
Mwanza
Lunguzi
Mwanzi
Lisongwe
Lifuni
Lufani
Mbawe
Domasi
Lunguzi
Naisi
Likangala
Nkondwi
Namasi
Mpimbi
Mchenzi
Mchula
Chipoka
Mabuka
Luchenza
Ruo
Mangasana
Matua
Mongwi
Chiperone
Changa
Luala
Lugera
Muyogo
Mlungusi
Mariamuverde
Amuvizi
Lifuhari
Zungwi
Midia
Metaso
Castigo
Stuibi
Mekombezi
Muzi
Chute
Morambala
Kigumbo
Shamo
Kaia
Nhakalonda
Bondeni
Morea
Lake Zu
Shuonga
Chiwanga
Pinda
L. Manza
Chirongi
Inyamgama
Nkuesa
Shimdwa
Shimechanga
Masangan
Bongua
Domwi
Mazoe
Nyasi
Maruwa
Inhamapoyo
Inyata Gorge
Mbenje
Gandi
Mlolo
Zoa
Mchacha
Mbuzi
Mpasu
Nsunde
Kanga H.
Zarima Pt.
Misanyi
Mt. Mlanje
Mt. Mongwi
Mt. Chiperone
Mt. Mangasana
Mt. Chiradzulu
Mt. Michuru
Mt. Sochi
Mt. Michesi
Mt. Chiromo


33°
34°
35°
South Latitude
9°
10°
11°
12°
NORTH NYASA
Nyika Plateau
7000
AHENGA
NYASA
NORTH ANGONI
WEST NYASA
SOUTH NYASA
BRITISH CENTRAL AFRICA
NORTH EASTERN RHODESIA
NORTH WESTERN RHODESIA
Karonga
Deep Bay
Mrowi
NKATA
Bandawe
Mt Chisitu
Mt Waller
Mt Mayuu
Mt Wanaj
Mumbera
Mt Lireche
Mt Chikanda
Mt Chikenesi
Mt Gaflingwi
Mt Kapoko
Mazoias
Mt Kasitu
Mt Kanyanda
Mt Kaubomba
Mt Chuandarara
Mt Temlwe
Mt Kanyinga
Mt Nkarapya
Mt Ngazi
Mt Kamtiga
Mt Jakwa
Mt Chowa
Mt Kayuni
Mt Kaiyele
Mt Kanyeda
Mt Kaiingko
Mt Kaiingwi
Mt Kaiingwa
Mt Kaiingwe
Mt Kaiingwo
Mt Kaiingwu
Mt Kaiingwy
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Mt Kaiingwx
Mt Kaiingwv
Mt Kaiingwt
Mt Kaiingws
Mt Kaiingwr
Mt Kaiingwq
Mt Kaiingwp
Mt Kaiingwo
Mt Kaiingwn
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Mt Kaiingwh
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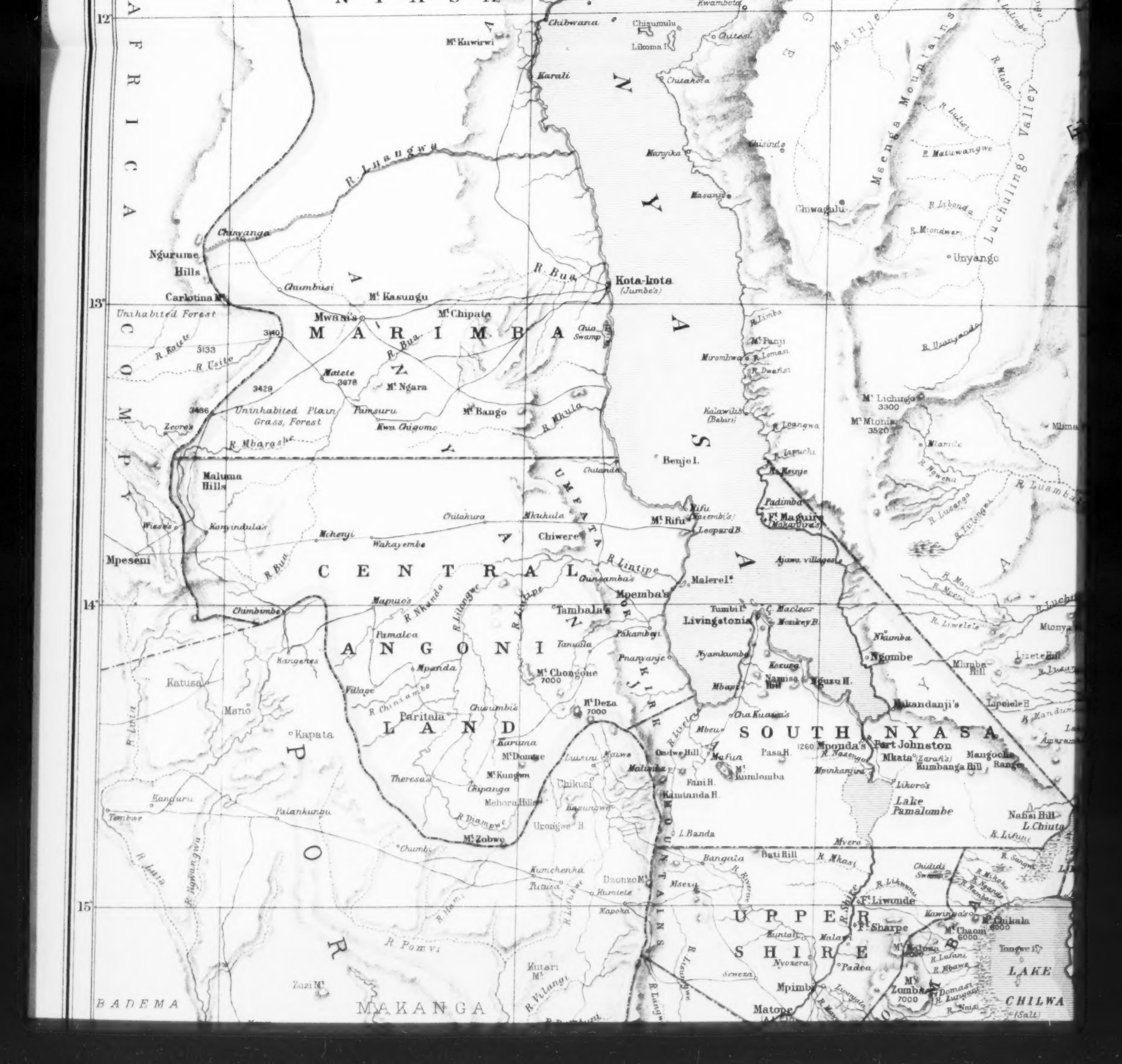
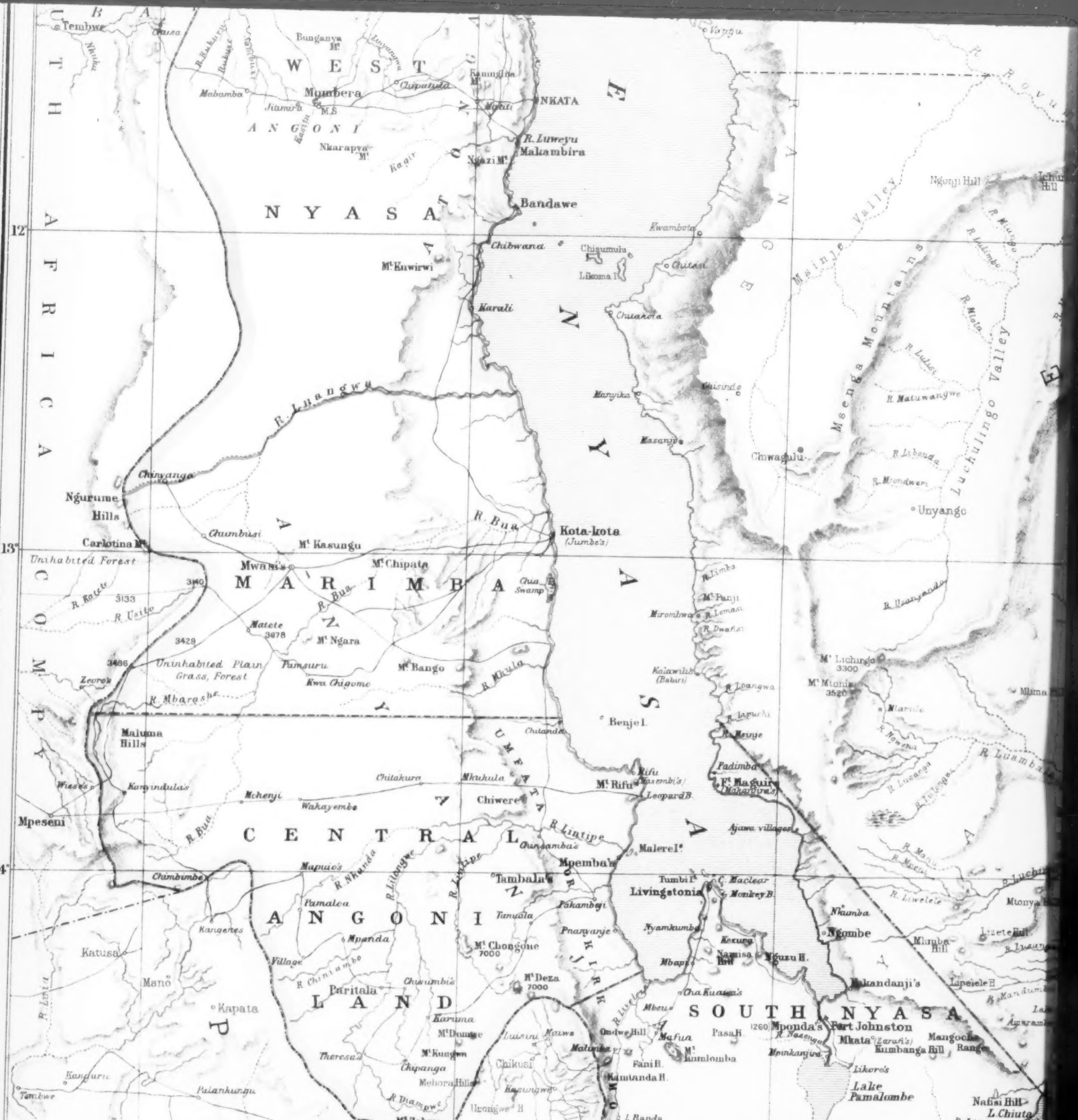
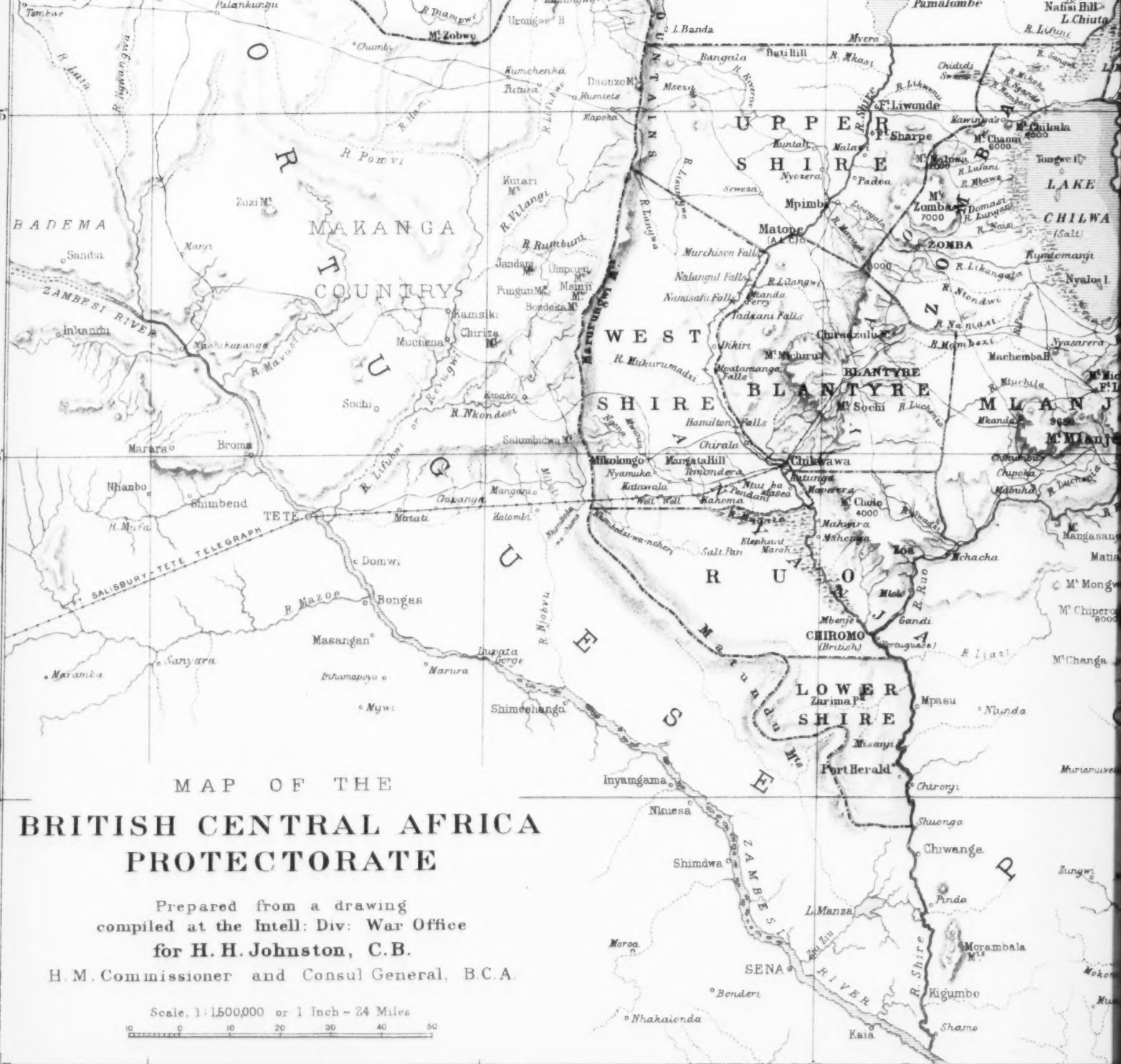
Mt Kaiingj
Mt Kaiingi
Mt Kaiingh
Mt Kaiingg
Mt Kaiingf
Mt Kaiinge
Mt Kaiingd
Mt Kaiingc
Mt Kaiingb
Mt Kaiinga
Mt Kaiing
Mt Kaiin
Mt Kaii
Mt Kai
Mt Ka
Mt K
Mt
Langenburg
Mwangwama
Mamaleambula
Mwandala
Mpangerambiba
Msindiri
Paparua
Mayage
Upamemipo
Ngerenge
Ikombe
Ndugemba
Umkanga
Chinga
Mpanza
Nyamba
Kwipoko
Mapumumuka
Kwiwesa
Mesuka
Wanda
Chirango
Chiteka
Mderuka
Karumwenze
Mangambe
Nyimba
Kaunda
Kaunga
Kachiriha
Katumba
Kanyu
Wira
Kanyeda
Kaiingko
Kaubomba
Chama
Kampampa
Temlwe
Chausa
Mwirecha
Mwembe
Mwigoli
Kapokolo
Makowa
Mpanza
Nyamba
Kwiwesa
Moina Pumba
Mderuka
Chite


AFRICA
NYASA
Kwamboto
Chibwana
Chisumulu
Likoma I.
Outesi
Mt Kuwirwi
Karali
Chitakola
Mangika
Chisindo
Masanje
Chwagulu
Unyango
Mt Panji
Mirombwa's
Mt Lichingo 3300
Mt Mtonia 3520
Mlima
Kalawilus (Baluri)
Benje I.
Chitanda
Padimba
Ft Maguire
Mt Rifu
Leopard B.
Chiwere
Ajawa villages
Malerel.
Tumbi I.
C. Maclear
Monkey B.
Livingstonia
Mpemba's
Tambala's
Pakamboyi
Tanyala
Pnanyanje
Nyamkumbo
Kasung
Namasi Hill
Nguru H.
Ngombe
Mlimba Hill
Mkandanji's
Mponda's
Port Johnston
Mkata
Zarah's
Mangochi
Kumbanga Hill
Range
Likoro's
Lake Pamalombe
Nafisi Hill
L. Chiuta
Pasa H.
Mafua
Mt Mlomba
Fani H.
Kamtanda H.
Ondwe Hill
Mt Deza 7000
Mt Chongone 7000
Mt Dowe
Mt Kungwa
Mt Zobwe
Mehoma Hills
Chikusi
Uronigwe H.
Chimbumbi
Paritala
Village
Mpanda
Pamalca
Tamalca
Mano
Katusa
Kapata
Kanguru
Palankungu
Tambwe
Theresa's
Chipanga
Karuma
Mawe
Lusiru
Malimba
Mbeu
Mbasi
Chia Kuasa's
Mbeu
Bangala
Bati Hill
Myera
Mkasi
Chididi Swamp
Ft Liwonde
Ft Sharpe
Ft Chikala
Mt Chaomi 6000
Mt Zomba 7000
Mpimbi
Matope
Padoa
Nyozera
Soweza
Kapoka
Kumchenha
Dzonzo Mt
Kumiete
Mseru
Kutuza
Kutari Mt
Zuzi Mt
Chumbe
Kanyindula's
Mchenji
Wakayembe
Mkukula
Chitakura
Chimbumbe
Mapuio's
Mwasi's
Mt Chipata
Mt Kasungu
Carlotina Mt
Ngurume Hills
Chumbusi
Chinyanga
Kota-kota
(Jumbe's)
Mt Ngara
Mt Bango
Matete 3678
Kwa Chigome
Tamsuru
Uninhabited Plain Grass, Forest
Uninhabited Forest
Maluma Hills
Mpeseni
Zeora's
Wiese's
Chia Swamp
Mkula
Mbaraghe
Usite
Kotete
3140
3133
3428
3486
MARIMBA
CENTRAL
ANGONI
LAND
SOUTH NYASA
UPPER SHIRE
LAKE CHILWA
(Salt)
MAKANGA
BADEMA
POROMBWE
MOUNTAINS
Mtonia Mountains
Mtonia Valley
Luchulingo Valley
R. Luangwa
R. Bua
R. Mbaraghe
R. Kotete
R. Usite
R. Mkula
R. Lintipe
R. Nkunda
R. Lilongwe
R. Linia
R. Ingwangwa
R. Pomvi
R. Thampwe
R. Chiniambe
R. Lucici
R. Shire
R. Mkasi
R. Likwenu
R. Mkoka
R. Ruo
R. Lufani
R. Mbawe
R. Domasi
R. Lunguzi
R. Nasi
R. Mtonia
R. Mtiwangwe
R. Lubeta
R. Libenda
R. Mtondwe
R. Lamba
R. Lomasi
R. Dwafisi
R. Loangwa
R. Lupacha
R. Kanye
R. Mpweta
R. Luambala
R. Lusenga
R. Lilongwe
R. Mpeta
R. Mkoka
R. Nyasa
R. Mkoka
R. Ruo
R. Lufani
R. Mbawe
R. Domasi
R. Lunguzi
R. Nasi
R. Mtonia
R. Mtiwangwe
R. Lubeta
R. Libenda
R. Mtondwe
R. Lamba
R. Lomasi
R. Dwafisi
R. Loangwa
R. Lupacha
R. Kanye
R. Mpweta
R. Luambala
R. Lusenga
R. Lilongwe
R. Mpeta
R. Mkoka
R. Nyasa
12°
13°
14°
15°


BRITISH CENTRAL AFRICA
PORTUGUESE
WEST ANGONI LAND
NYASA
MARIMBA
CENTRAL ANGONI LAND
SOUTH NYASA
Tembwe
Mumbera
Bunganya
NKATA
Makambira
Bandawe
Chibwana
Karali
Kota-kota
Ngurumo Hills
Carlotina
Mwasi's
Mt Chipata
Mt Kasungu
Mt Ngara
Mt Bango
Matete
Chinyanga
Chumbusi
Unyango
Chwangulu
Benje I.
Mt Rifu
Padimba
Ft Maguire
Chiwere
Mpeseni
Malereł
Mpemba's
Tambala's
Livingstonia
Ngombe
Mkandanji's
Mponda's
Port Johnston
Mkata
Lake Pamalumbe
Katusa
Mano
Kapata
Paritala
Mt Deza
Mt Chongone
Mt Kungwe
Mt Dumge
Kamtanda H.
Fani H.
Mafun
Pasa H.
Ondwe Hill
Nafisi Hill
L Chiuta
Ngonji Hill
Ichuri Hill
Msenga Mountains
Luchulingo Valley
Mt Kuwirwi
Chitanda
Chitanda
Kasungu
Chia Swamp
Benje I.
Mt Panji
Mt Lichingo 3300
Mt Mtonia 3520
Mt Mlanje
Mt Chiradzulu
Mt Zomba
Mt Malosa
Mt Mangochi
Mt Namwera
Mt Mpondwe
Mt Mpingwe
Mt Mpingwe
Mt Mping


MAP OF THE
BRITISH CENTRAL AFRICA PROTECTORATE
Prepared from a drawing compiled at the Intell: Div: War Office for H. H. Johnston, C.B.
H. M. Commissioner and Consul General, B.C.A.
Scale, 1:1,500,000 or 1 Inch = 24 Miles
0 10 20 30 40 50
15°
16°
17°
33° Longitude East of Greenwich. 34° 35°
BADEMA COUNTRY
MAKANGA COUNTRY
MARUTSE COUNTRY
UPPER SHIRE
WEST SHIRE
BLANTYRE
LOWER SHIRE
MANGANJA
LAKE CHILWA
ZOMBA
ZAMBESI RIVER
SALISBURY-TETE TELEGRAPH
ZAMBESI RIVER
R. Shire
R. Ruo
R. Mazoe
R. Luangwa
R. Pomvi
R. Vilangi
R. Rumburi
R. Nkondezi
R. Mavisi
R. Lifubui or Revungi
R. Diampwe
R. Luia
R. Nyangwa
R. Ruenya
R. Mukurumadzi
R. Likubula
R. Lunsemfwa
R. Lufubu
R. Lukusuzi
R. Luchenza
R. Likangala
R. Lisungwi
R. Mlosi
R. Mbawe
R. Lufani
R. Domasi
R. Nasi
R. Mambezi
R. Namasi
R. Ntondwi
R. Likangala
R. Lilangwi
R. Mwanza
R. Mkoko
R. Mpamba
R. Mkhasi
R. Likwenu
R. Sangwi
R. Mkoka
R. Mpimbi
R. Mtiwa
R. Mpasu
R. Lisungwi
R. Lichenya
R. Lifuni
R. Mkhasi
R. Shire
R. Ruo
R. Luchenza
R. Mlanje
R. Lisungwi
Mt. Zobwe
Mt. Zomba 7000
Mt. Chaom 6000
Mt. Kolowa 6000
Mt. Chikala 4000
Mt. Zomba 7000
Mt. Mlanje 9650
Mt. Michuru
Mt. Sochi
Mt. Chiperone 8000
Mt. Mongwe
Mt. Changa
Mt. Mangasana
Mt. Chiradzulu 4000
Mt. Chiromo
Mt. Mlanje
Mt. Chiromo (British)
Mt. Chiromo (Portuguese)
Mt. Ms
Mt. Mlanje 9650
Mt. Mlanje
Mt. Mlanje
Mt. Mlanje